



# PRODUCT CATALOG

VERSION: 2018V1



**WE ARE LIGHTNING PROTECTION**



# CATALOG DIRECTORY

In this, our 7th generation catalog, VFC has once again put together the highest quality and most comprehensive line of Lightning Protection components possible. All products supplied by VFC meet the requirements of NFPA 780, UL 96A, LPI 175, and where applicable are UL listed.

All of the products described in this edition of VFC's catalog conform to the concept of "Lowest System Cost." Our commitment to this concept has been key to VFC's rapid growth in the market place. Ask your local representative for details on how this concept can benefit your project. In addition to the products described within, VFC has the capability of custom designing products to meet any specific needs. Customers should not hesitate to contact VFC with special requests. Solutions are our business.

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# COPPER LIGHTNING CONDUCTORS

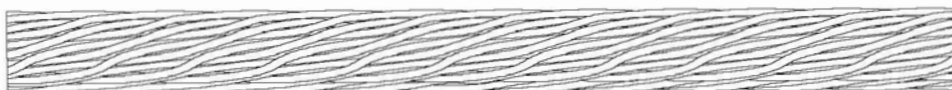
## CLASS I MAIN COPPER CONDUCTORS

SECTION **100**

Catalog No.	Strand Size (AWG)	Strands	X-Sectional Area (cm.)	Tinned	Approx. Diameter (in.)	Approx. Weight per 1,000 ft. (lbs.)	Standard Reel Size (ft.)	Approx. Reel Wt. (lbs.)
LC2917C	17	29	61,350	No	3/8	189	500	100
LC2917T	17	29	61,350	Yes	3/8	189	500	100
LC3217C	17	32	67,700	No	7/16	200	300	74

### Notes:

- Class I lightning conductors are manufactured using a special smooth weave process. This process maximizes the surface area of the conductor while allowing greater installation flexibility.
- Class I Minimum Requirements:
  - 187 pounds per 1,000 feet.
  - Cross-sectional area of 57,400 circular mils.
  - Minimum strand size 17 AWG.
- Listed to UL® 96.

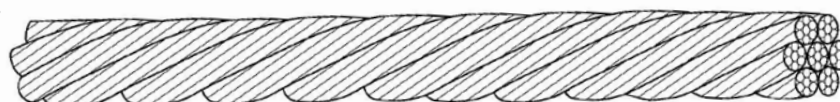


## CLASS II MAIN COPPER CONDUCTORS

Catalog No.	Strand Size (AWG)	Strands	X-Sectional Area (cm.)	Tinned	Approx. Diameter (in.)	Approx. Weight per 1,000 ft. (lbs.)	Standard Reel Size (ft.)	Approx. Reel Wt. (lbs.)
LC2814C	14	28	125,600	No	1/2	380	250	105
LC2814T	14	28	125,600	Yes	1/2	380	250	105

### Notes:

- Class II lightning conductors are manufactured using a special rope lay process. This process maximizes the surface area of the conductor while allowing greater installation flexibility.
- Class II Minimum Requirements:
  - 375 pounds per 1,000 feet.
  - Cross-sectional area of 115,000 circular mils.
  - Minimum strand size 15 AWG.
- Listed to UL® 96.



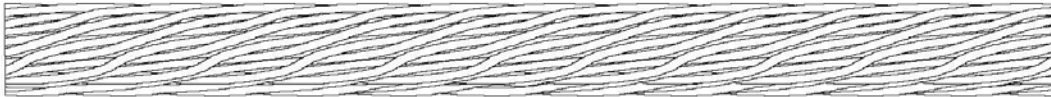
# ALUMINUM LIGHTNING CONDUCTORS

## CLASS I MAIN ALUMINUM CONDUCTORS

Catalog No.	Strand Size (AWG)	No. of Strands	X-Sectional Area (cm.)	Approx. Diameter (in.)	Approx Weight per 1,000 ft. (lbs)	Standard Reel Size (ft)	Approx. Reel Wt. (lbs)
LC2414A	14	24	98,600	7/16	98	500	56

### Notes:

- Class I lightning conductors are manufactured using a smooth weave process. This process maximizes the surface area of the conductor while allowing greater installation flexibility.
- Class I Minimum Requirements:
  - 95 pounds per 1,000 feet.
  - Cross-sectional area of 98,600 circular mils.
  - Minimum strand size 14 AWG.
- Listed to UL® 96.

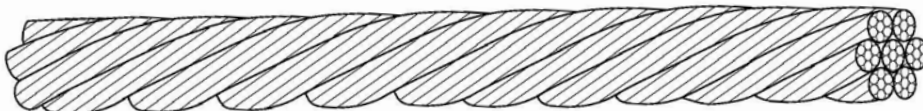


## CLASS II MAIN ALUMINUM CONDUCTORS

Catalog No.	Strand Size (AWG)	No. of Strands	X-Sectional Area (cm.)	Approx. Diameter (in.)	Approx Weight per 1,000 ft. (lbs)	Standard Reel Size (ft)	Approx. Reel Wt. (lbs)
LC2411A	11	24	203,391	5/8	197	500	105

### Notes:

- Class II lightning conductors are manufactured using a rope lay process. This process maximizes the surface area of the conductor while allowing greater installation flexibility.
- Class II Minimum Requirements:
  - 190 pounds per 1,000 feet.
  - Cross-sectional area of 192,000 circular mils.
  - Minimum strand size 13 AWG.
- Listed to UL® 96.



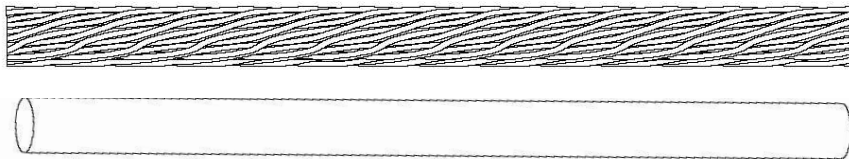
# LIGHTNING CONDUCTORS

## COPPER AND ALUMINUM BONDING CONDUCTORS

Catalog No.	Strand Size (AWG)	No. of Strands	X-Sectional Area (cm)	Approx. Diameter (in.)	Approx Weight per 1,000 ft. (lbs)	Standard Reel Size (ft.)	Approx Reel Wt. (lbs)
SC14C	17	14	29,600	1/4	92	500	55
SC10A	14	10	44,800	5/16	130	500	70
SC4A	4	1	41,470	1/4	127	500	67

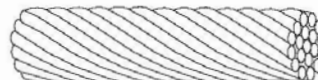
### Notes:

- Copper bonding conductors must have 14 strands of .045 inch diameter wire.
- Aluminum bonding conductors must have 10 strands of .064 inch diameter wire or a single strand of .204 inch diameter wire.
- Listed to UL® 96.



## STRANDED COPPER CONDUCTORS

Catalog No.	Strand Size (AWG)	No. of Strands	X-Sectional Area (cm)	Approx Weight per 1,000 ft (lbs)	Standard Reel Size (ft)	Approx Reel Wt (lbs)
67C	6	7	26,240	81	1,000	85
47C	4	7	41,740	127	1,000	132
27C	2	7	66,360	204	1,000	209
1/0C	1/0	19	105,600	325	500	168
2/0C	2/0	19	133,100	410	500	210
3/0C	3/0	19	167,800	518	500	264
4/0C	4/0	19	211,600	653	500	332
250C	250	19	250,000	772	250	198
500C	500	37	500,000	1544	250	391



### Notes:

- Sizes up to 1000 MCM are available.
- VFC offers standard reel sizes; however, we will cut to specified lengths.
- Bare stranded conductor shall meet the requirements of ASTM B-8.
- Stranded conductors available tinned. Please use suffix "T" when ordering.
- Insulated conductor available upon request.

# UNIVERSAL AIR TERMINAL

## CLASS I COPPER AIR TERMINAL

### 3/8 INCH DIAMETER

SECTION **200**

Catalog No. Copper	Length (in)	Box Qty.	Approx. Box Wt. (lbs.)
AT3812C	12	10	5
AT3818C	18	10	9
AT3824C	24	10	9
AT3836C	36	10	18-3/4
AT3848C	48	10	21
AT3860C	60	10	27-1/4

#### Notes:

- Class I air terminals are used on structures up to 75 feet tall.
- Class I Minimum Requirements:
- Minimum diameter is 3/8 inch solid.
  - The tip of an air terminal shall be not less than 10 inches (254 mm) above the object or area it is to protect.\*
  - Manufactured from highly conductive electrolytic tough pitch, alloy 110 copper.
- Conductivity greater than 99% when annealed.
- Utilizes standard UNC threads.
- Adapters sold separately.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



\*NFPA 780 Section 3-6.1 Air Terminal Height

# UNIVERSAL AIR TERMINAL

## CLASS II COPPER AIR TERMINAL

### 1/2 INCH DIAMETER

Catalog No.	Length (in)	Box Qty.	Approx. Box Wt. (lbs.)
AT1212C	12	10	8
AT1218C	18	10	11-3/4
AT1224C	24	10	15-1/2
AT1236C	36	10	23-1/4
AT1248C	48	10	31
AT1260C	60	10	38-3/4
AT1272C	72	10	46-1/2

#### Notes:

- Class II air terminals are used on structures greater than 75 feet tall.
- Class II Minimum Requirements:
  - Minimum diameter is 1/2 inch solid.
  - The tip of an air terminal shall be not less than 10 inches (254 mm) above the object or area it is to protect.\*
- Manufactured from highly conductive electrolytic tough pitch, alloy 110 copper.
- Conductivity greater than 99% when annealed.
- Utilizes standard UNC threads.
- Adapters sold separately.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



\*NFPA 780 Section 4.6.2 Air Terminal Height



# UNIVERSAL AIR TERMINAL

## CLASS I ALUMINUM AIR TERMINAL

### 1/2 INCH DIAMETER

Catalog No.	Length (in)	Box Qty.	Approx. Box Wt. (lbs.)
AT1212A	12	10	3
AT1218A	18	10	3-3/4
AT1224A	24	10	5
AT1236A	36	10	8-1/4
AT1248A	48	10	10
AT1260A	60	10	12-3/4
AT1272A	72	10	16-1/2

#### Notes:

- Class I air terminals are used on structures less than 75 feet tall.
- Class I Minimum Requirements:
  - Minimum diameter is 1/2 inch solid.
  - The tip of an air terminal shall be not less than 10 inches (254 mm) above the object or area it is to protect.\*
- Manufactured from highly conductive aluminum
- Conductivity greater than 99% when annealed.
- Utilizes standard UNC threads.
- Adapters sold separately.
- Listed to UL® 96.



\*NFPA 780 Section 4.6.2 Air Terminal Height

# UNIVERSAL AIR TERMINAL

## CLASS II ALUMINUM AIR TERMINAL

### 5/8 INCH DIAMETER

Catalog No.	Length (in)	Box Qty.	Approx. Box Wt. (lbs.)
AT5812A	12	10	4
AT5818A	18	10	6
AT5824A	24	10	8
AT5836A	36	10	12-3/4
AT5848A	48	10	17-1/2
AT5860A	60	10	21-1/2
AT5872A	72	10	25-1/2

#### Notes:

- Class II air terminals are used on structures greater than 75 feet tall.
- Class II Minimum Requirements:
  - Minimum diameter is 5/8 inch solid.
  - The tip of an air terminal shall be not less than 10 inches (254 mm) above the object or area it is to protect.\*
- Manufactured from highly conductive aluminum.
- Conductivity greater than 99% when annealed.
- Utilizes standard UNC threads.
- Adapters sold separately.
- Listed to UL® 96.



\*NFPA 780 Section 4.6.2 Air Terminal Height

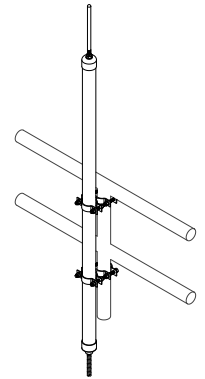
# AIR TERMINAL MAST ASSEMBLIES

## AIR TERMINAL WITH FIBERGLASS MAST ASSEMBLY

Catalog No.	Fiberglass Pipe Length (ft.)	Air Terminal Length (in.)	Conductor Type	Exposed Conductor Length (ft)	Approx. Wt. Each (lbs.)
FM10	10	24	LC28C	10	20
FM20	20	24	LC28C	10	34

**Notes:**

- Designed for use with towers or other structures which require long air terminal extensions.
- Protects tower lighting, antennas and miscellaneous equipment from direct lightning strikes.
- Copper braided lightning conductor is attached to the air terminal and extends past the end of the pole.
- Masts are made of UV-resistant, rigid fiberglass-reinforced plastic with an OD of 2" and 1/4" wall thickness.
- Requires part MBG (not included) for mounting to tower platform.

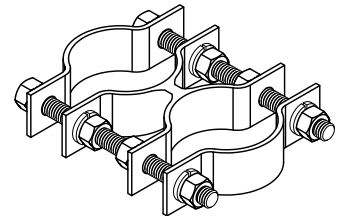


## MAST MOUNTING BRACKET

Catalog No.	OD Range (in.)	Material	Approx Wt. Each (lbs.)
MBG	1.3 to 3.5	Galvanized Steel	7

**Notes:**

- Mounts Fiberglass Mast assembly to vertical pole or tower angle members up to 3" per side.
- Includes 1/2" mounting hardware. Tighten nuts to 516 in-lbs when installing.

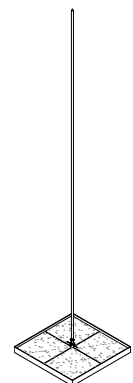


## BALLASTED STRIKE TERMINATION DEVICE

Catalog No.	Diameter (in.)	Height (ft.)
BST10	5/8	10

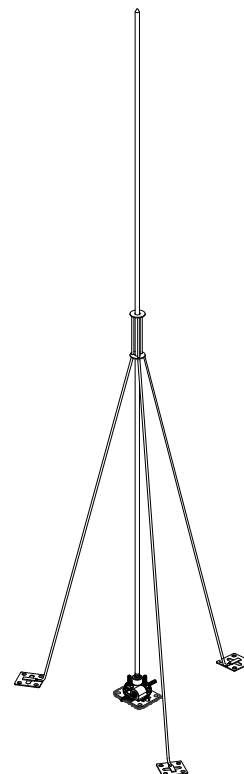
**Notes:**

- Enables quick, simple installation without the need for fasteners or adhesives.
- Stainless steel frame and strike point, concrete ballasts.



# AIR TERMINAL MAST ASSEMBLIES

## AIR TERMINAL WITH TRIPOD BRACE



Catalog No.	Diameter (in.)	Height (ft.)	Air Terminal Material
ATB5810A	5/8	10	Aluminum

### Notes:

- Assembly Includes:
  - Galvanized steel tripod brace with adhesive-mount feet
  - Air terminal
  - Universal Base

# AIR TERMINAL ADAPTERS

## FLEXIBLE ADAPTERS

Catalog No.	Material	Thread A	Thread B	Box Qty.	Approx. Box Wt. (lbs.)
FA12FFC	Copper Alloy	1/2" Female	1/2" Female	10	5
FA12FMC	Copper Alloy	1/2" Female	1/2" Male	10	7
FA58FFC	Copper Alloy	5/8" Female	5/8" Female	10	5
FA12FFA	Aluminum	1/2" Female	1/2" Female	10	4
FA12FMA	Aluminum	1/2" Female	1/2" Male	10	4-1/4
FA58FFA	Aluminum	5/8" Female	5/8" Female	10	4

### Notes:

- Flexible air terminal adapters are used with air terminals located underneath window washing or other mobile equipment.
- Comes complete with stainless steel spring and internal safety chain.
- Can be used in conjunction with safety tipped air terminals.
- Listed to UL® 96.



Male Thread (M)



Female Thread (F)

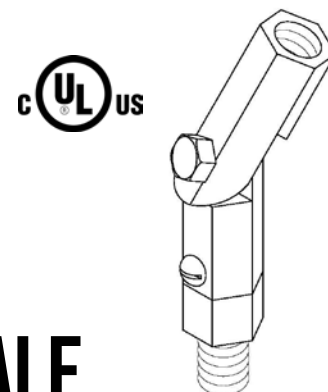
# AIR TERMINAL ADAPTERS

## SWIVEL ADAPTERS FEMALE TO MALE

Catalog No.	Material	Female Thread (in.)	Male Thread (in.)	Box Qty.	Approx. Box Wt. (lbs.)
SA3838FMC	Copper Alloy	3/8	3/8	10	5
SA1212FMC	Copper Alloy	1/2	1/2	10	5
SA1212FMA	Aluminum	1/2	1/2	10	2

### Notes:

- Used to plumb air terminals where the bases are mounted on sloping surfaces.
- Male configuration designed to fit internally threaded air terminal bases.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.

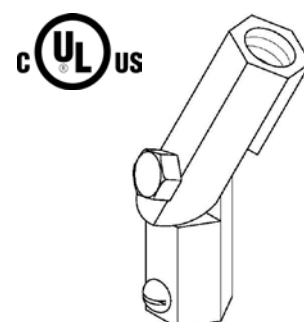


## SWIVEL ADAPTERS FEMALE TO FEMALE

Catalog No.	Material	Thread A (in.)	Thread B (in.)	Box Qty.	Approx. Box Wt. (lbs.)
SA3838FFC	Copper Alloy	3/8	3/8	10	4
SA3812FFC	Copper Alloy	3/8	1/2	10	4
SA3858FFC	Copper Alloy	3/8	5/8	10	4
SA1212FFC	Copper Alloy	1/2	1/2	10	4
SA1258FFC	Copper Alloy	1/2	5/8	10	4
SA5858FFC	Copper Alloy	5/8	5/8	10	4
SA1212FFA	Aluminum	1/2	1/2	10	1-1/2
SA1258FFA	Aluminum	1/2	5/8	10	1-1/2
SA5858FFA	Aluminum	5/8	5/8	10	1-1/2

### Notes:

- Used to plumb air terminals to vertical where the bases are mounted on sloping surfaces.
- Swivel adapters are available in various thread configurations to allow the matching of air terminals to all bases.
- Stainless steel screws allow the adapter to be locked in any position.
- All threads listed are standard UNC.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



# AIR TERMINAL ADAPTERS

## COPPER & ALUMINUM EXTENSION ROD COUPLERS

Catalog No.	Material	Diameter (in.)	Box Qty.	Approx. Box Wt. (lbs.)
EC12C	Copper Alloy	1/2	10	2-1/2
EC12A	Aluminum	1/2	10	1

**Notes:**

- Used to couple two rods together.
- Available tinned. Please use suffix "T" when ordering.
- All threads are UNC.
- Listed to UL® 96.



# AIR TERMINAL EXTENSION RODS

## COPPER & ALUMINUM AIR TERMINAL EXTENSION RODS

Catalog No.	Material	Diameter (in.)	Length (in.)	Box Qty.	Approx. Box Wt. (lbs.)
ATE1224C	Copper	1/2	24	10	1-1/2
ATE1224A	Aluminum	1/2	24	10	1/2

**Notes:**

- Solid copper or aluminum extension rods are used to extend standard air terminals to lengths required.
- Extension rods are available in lengths up to 12 feet and have standard UNC threads at each end.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



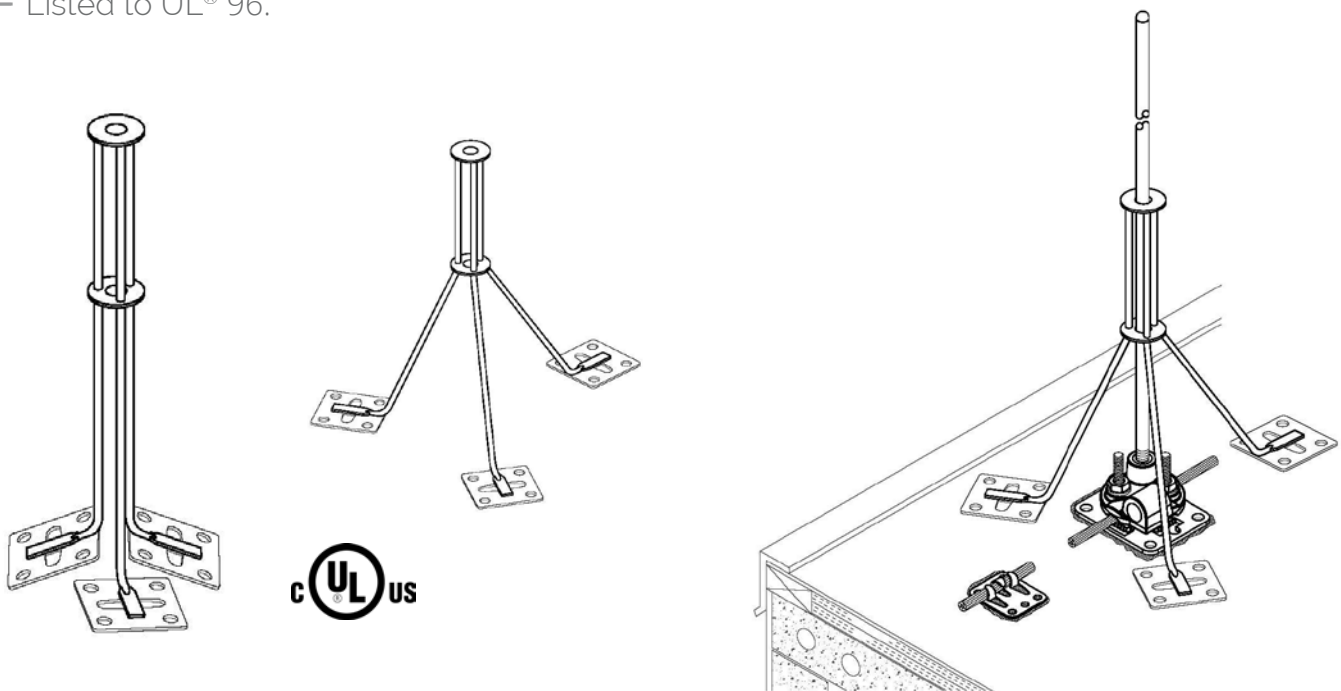
# AIR TERMINAL BRACES

## GALVANIZED STEEL TRIPOD BRACES

Catalog No.	Mounting Type	Length Prior to Installation	Supports AT Range (in.)	Box Qty.	Approx. Box Wt. (lbs.)
TSA18G	Adhesive Feet	18	24-32	10	12-3/4
TSA24G	Adhesive Feet	24	32-42	10	16-1/4
TSA36G	Adhesive Feet	36	42-54	10	20-1/4
TSA48G	Adhesive Feet	48	54-76	10	22-1/4

### Notes:

- Air terminals shall be secured against overturning by attachment to the object to be protected or by means of braces that shall be permanently and rigidly attached to the building. An air terminal exceeding 24 inches (600 mm) in height shall be supported at a point not less than one half its height.\*
- Constructed of galvanized steel.
- Braces available with 3/16 inch holes for anchoring with screws, nails, or with the adhesive feet when mounting to roofing membranes or similar surfaces where penetrations cannot be made.
- Listed to UL® 96.



\*NFPA 780 Section 4.6.2.2 Air Terminal Support

# AIR TERMINAL BASES

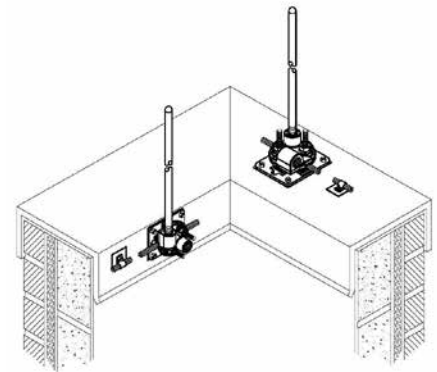
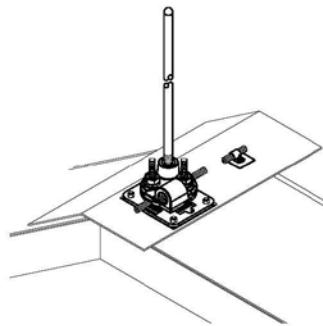
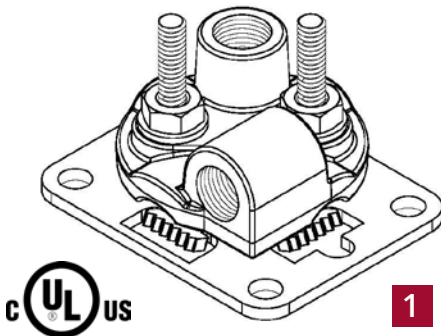
## AIR TERMINAL TKU BASE

# SECTION 300

Catalog No.	Air Terminal Diameter (in.)	Material	Unit weight (lbs.)	Box Qty.
TKUB38C	3/8	Copper Alloy	1.07	10
TKUB12C	1/2	Copper Alloy	1.07	10
TKUB58C	5/8	Copper Alloy	1.07	10
TKUB38T	3/8	Tinned Copper Alloy	1.07	10
TKUB12T	1/2	Tinned Copper Alloy	1.07	10
TKUB58T	5/8	Tinned Copper Alloy	1.07	10
TKUB12A	1/2	Aluminum Alloy	0.39	10
TKUB58A	5/8	Aluminum Alloy	0.39	10

The TKU series bases have an articulating puck, allowing the attached air terminal to be true plumb on surfaces with a slope up to 4/12 (25 degrees) without the need for an additional swivel adapter.

Manufactured from high quality copper alloy or aluminum alloy, these TKU air terminal bases can be mounted horizontally or vertically to secure an air terminal to a roof or wall, and include an innovative feature permitting adjustment to vertical on uneven surfaces.



### Notes:

- Suitable for use with all Class I and Class II main size lightning protection conductors in our range.
- Includes 4 x 1/4" drilled holes for connection to masonry or roof lines using self-tapping screws, nails or adhesive.
- Also available in nickel plated copper alloy. Please contact us for further information.
- Up to 4/12 slope, no swivel adapter needed.
- Listed to UL® 96.

### TKU Series Installation:

- Install the TKU base using screws or appropriate adhesive.
- Install conductor between plate and puck.
- Install air terminal in puck.
- Be sure to position (plumb) the attached air terminal, then tighten the bolts to lock the air terminal in position and create a tight connection with conductor. Do not over-tighten the nuts, applied torque should not exceed 80 in-lbs.

**1** This product may be subject to patent rights of VFC. Consult your patent attorney about your rights and responsibilities regarding patented products.

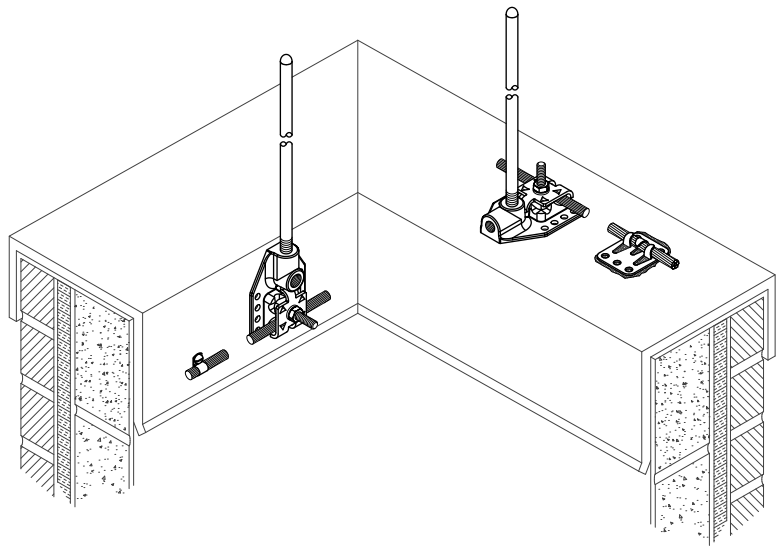
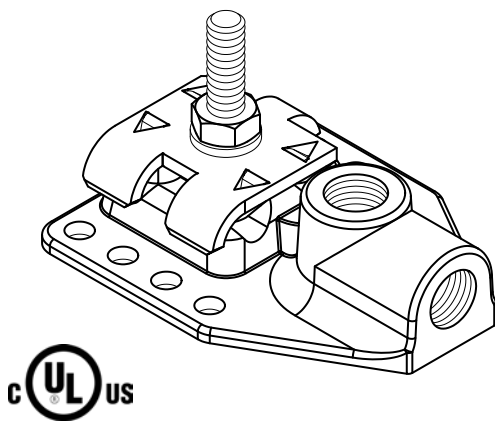


# UNIVERSAL SERIES HORIZONTAL AND VERTICAL BASES

Catalog No.	Material	Internal Threaded Diameter (in.)	Box Qty.	Approx. Box Wt. (lbs.)
UB38C	Copper Alloy	3/8	5	4-1/4
UB12C	Copper Alloy	1/2	5	4-1/4
UB58C	Copper Alloy	5/8	5	4-1/4
UB12A	Aluminum	1/2	5	1-1/2
UB58A	Aluminum	5/8	5	1-1/2

## Notes:

- 2-5/8 inch by 3 inch base features a universal mounting design allowing it to be installed either horizontally or vertically.
- Utilizes a variety of mounting applications such as self tapping screws, nails, or adhesives.
- This series features an internally threaded hub design.
- Suitable for Class I and II conductor.
- Listed to UL® 96.



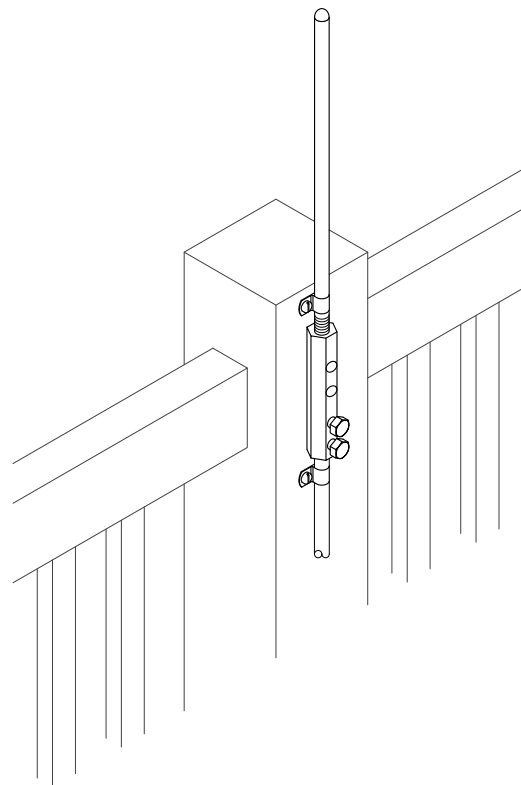
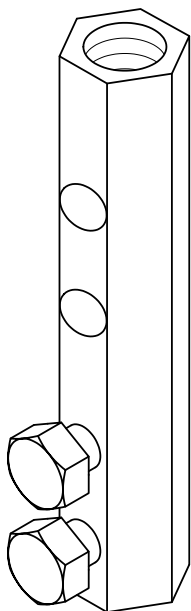
# AIR TERMINAL BASE

## VERTICAL BASE

Catalog No.	Material	Internal Thread Diameter (in.)	Box Qty.	Approx. Box Wt. (lbs.)
VB38C	Copper Alloy	3/8"	10	4-1/4
VB12C	Copper Alloy	1/2"	10	4-1/4
VB12A	Aluminum	1/2"	10	1-3/4
VB58A	Aluminum	5/8"	10	1-3/4

### Notes:

- 3-3/4 inch long, vertical base connector features two 1/4 inch mounting holes and two stainless steel cap screws to ensure a good electrical connection.
- For all standard cables up to 1/2 inch in diameter.
- Available tinned. Please add suffix "T" when ordering.
- Listed to UL® 96.

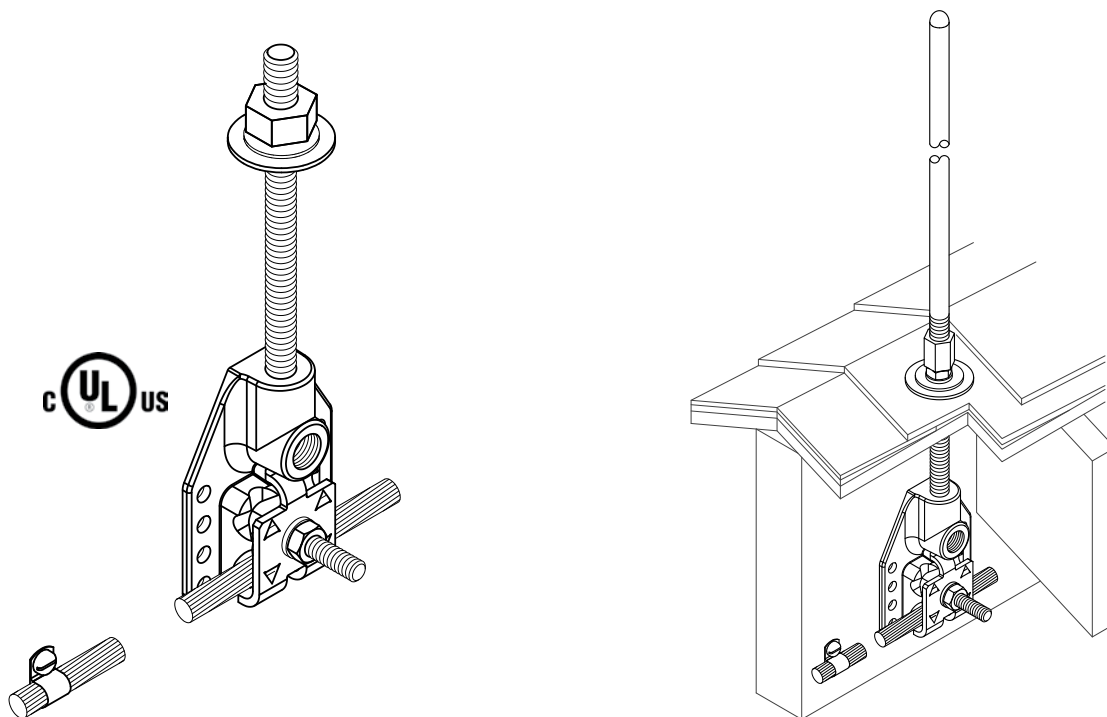


# CONCEALED BASE ASSEMBLY

Catalog No.	Material	Riser Bar Length (in.)	Riser Bar Diameter (in.)	Box Qty.	Approx. Box Wt. (lbs.)
CB12C	Copper Alloy	12	1/2	10	10-1/4
CB18C	Copper Alloy	18	1/2	10	15-1/2
CB12A	Aluminum	12	1/2	10	8-1/4
CB18A	Aluminum	18	1/2	10	12-1/4

## Notes:

- Vertical concealed base assembly designed to be mounted on ridge boards or roof trusses.
- Horizontal concealed base assembly is designed for use on flat roof decks or other flat surfaces.
- Stainless steel jam nuts and washers are provided along with special neoprene sealing washer to assure a watertight installation.
- Suitable for Class I and II conductor.
- Listed to UL® 96.



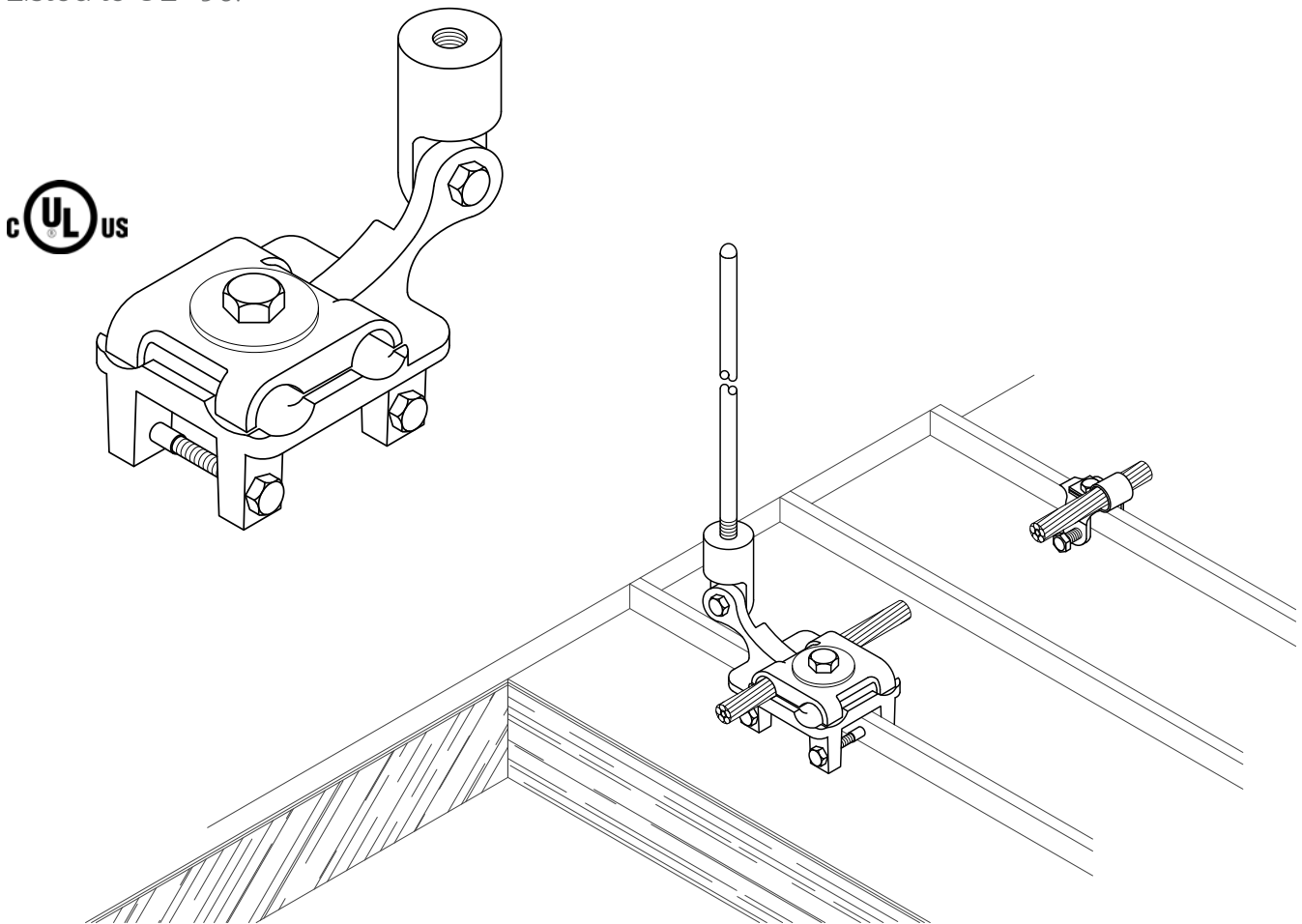
# AIR TERMINAL BASE

## STANDING SEAM BASES

Catalog No.	Material	Thread Diameter (in.)	Box Qty.	Approx. Box Wt. (lbs.)
SSB12A	Aluminum	1/2	10	5
SSB58A	Aluminum	5/8	10	5

### Notes:

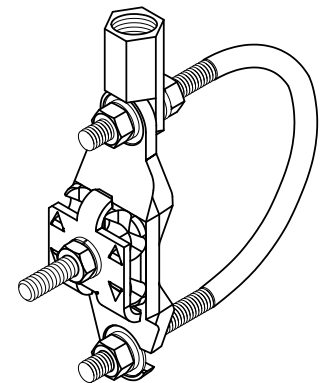
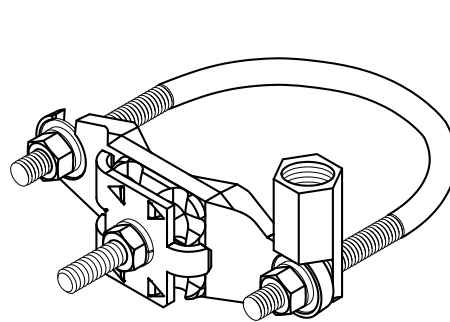
- Fits up to 3/4 inch wide seam.
- Omni directional base design allows conductor to be coursed parallel or perpendicular to seam.
- Accepts a wide variety of conductors ranging from #14 bonding conductors up through Class II main lightning conductors.
- Suitable for Class I and II conductor.
- Listed to UL® 96.



# AIR TERMINAL BASE

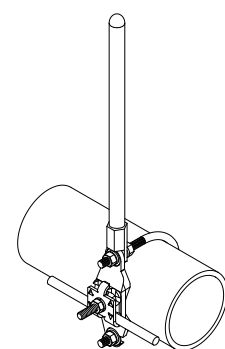
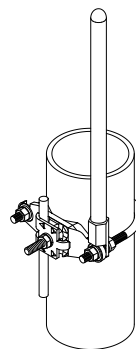
## PIPE RAILING BASES TINNED COPPER

Catalog No.	Nominal Pipe Size Range (in.)	Outside Diameter Pipe Size Range (in.)	Air Terminal Size (in.)	Box Qty.	Approx. Box Wt. (lbs.)
PB1238T	0.5 to 1	0.5 to 1.25	3/8	5	3-3/4
PB1212T	0.5 to 1	0.5 to 1.25	1/2	5	3-3/4
PB11238T	1 to 2	1 to 2.4	3/8	5	4-3/4
PB11212T	1 to 2	1 to 2.4	1/2	5	4-3/4
PB21238T	2.5 to 3.5	3 to 4	3/8	5	6
PB21212T	2.5 to 3.5	3 to 4	1/2	5	6
PB438T	3 to 5	3.5 to 5.5	3/8	5	7-1/4
PB412T	3 to 5	3.5 to 5.5	1/2	5	7-1/4
PB638T	4.5 to 6	5 to 6.5	3/8	5	10
PB612T	4.5 to 6	5 to 6.5	1/2	5	10



### Notes:

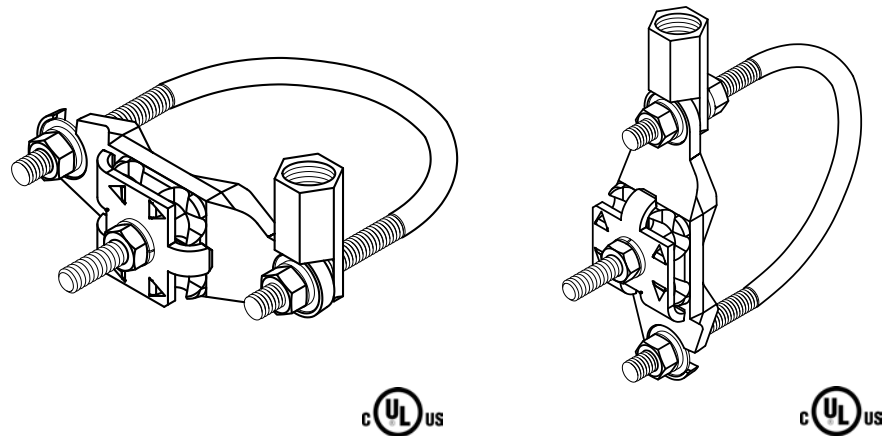
- Swivel adapter design allows for mounting at any angle.
- Air terminal not included.
- Suitable for Class I and II conductor
- Listed to UL® 96.



# AIR TERMINAL BASE

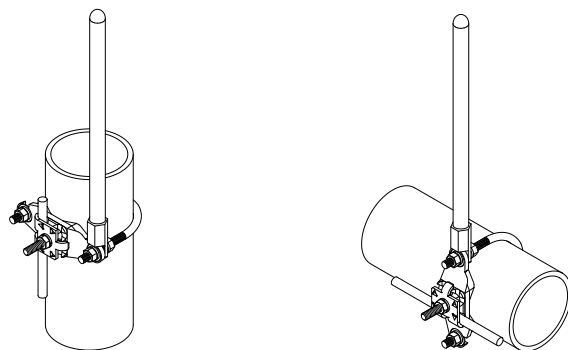
## PIPE RAILING BASES ALUMINUM

Catalog No.	Nominal Pipe Size Range (in.)	Outside Diameter Pipe Size Range (in.)	Air Terminal Size (in.)	Box Qty.	Approx. Box Wt. (lbs.)
PB1212A	.5 to 1	0.5 to 1.25	1/2	5	1-3/4
PB1258A	.5 to 1	0.5 to 1.25	5/8	5	1-3/4
PB11212A	1 to 2	1 to 2.4	1/2	5	2-1/2
PB11258A	1 to 2	1 to 2.4	5/8	5	2-1/2
PB21212A	2.5 to 3.5	3 to 4	1/2	5	3
PB21258A	2.5 to 3.5	3 to 4	5/8	5	3
PB412A	3 to 5	3.5 to 5.5	1/2	5	3-1/2
PB458A	3 to 5	3.5 to 5.5	5/8	5	3-1/2
PB612A	4.5 to 6	5 to 6.5	1/2	5	4
PB658A	4.5 to 6	5 to 6.5	5/8	5	4



### Notes:

- Swivel adapter design allows for mounting at any angle.
- Air terminal not included.
- Suitable for Class I and II conductor.
- Listed to UL® 96.



# CABLE CONNECTORS

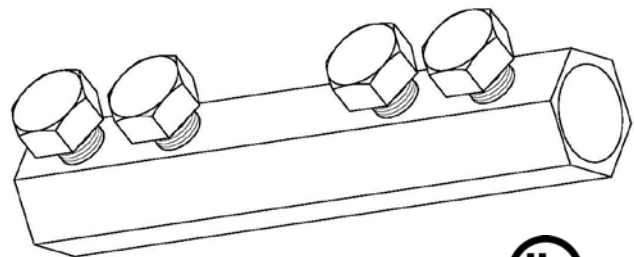
## IN-LINE CABLE SPLICE

SECTION **400**

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
ISC	Copper	10	4
ISA	Aluminum	10	2
ISB	Bimetal	10	3

### Notes:

- 4 inch connector provides at least 1-1/2 inches of contact with conductor, creating a straight connection.
- Four 5/16 inch by 1/2 inch hex head stainless steel cap screws assure a positive electrical connection.
- Suitable for Class I and II conductor.
- Listed to UL® 96.

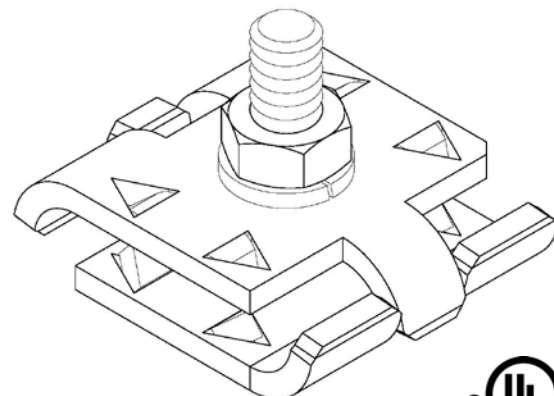


# ONE BOLT PARALLEL SPLICE

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
PSC	Copper Alloy	10	2
PSA	Aluminum	10	1
PSB	Bimetal	10	2
PSDBC	Copper Alloy	10	4

### Notes:

- Single bolt, two-piece connector provides over 1-1/2 inch surface of contact with conductor, creating a parallel connection.
- Suitable for Class I and II conductor.
- Bimetallic splicer (PSB) includes a stainless steel plate to isolate dissimilar metals.
- Available tinned. Please use suffix "T" when ordering.
- PSC, PSA, and PSB are listed to UL® 96.
- PSDBC is suitable for direct burial in earth and concrete, listed to UL® 467.



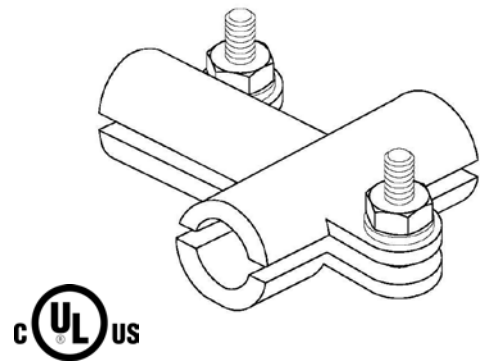
# CABLE CONNECTORS

## T-CONNECTOR

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
TCC	Copper Alloy	10	5
TCA	Aluminum	10	2

**Notes:**

- T-connector splices two perpendicular conductors providing at least a 1-1/2" connection with each.
- Suitable for use with all Class I and II conductors.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.

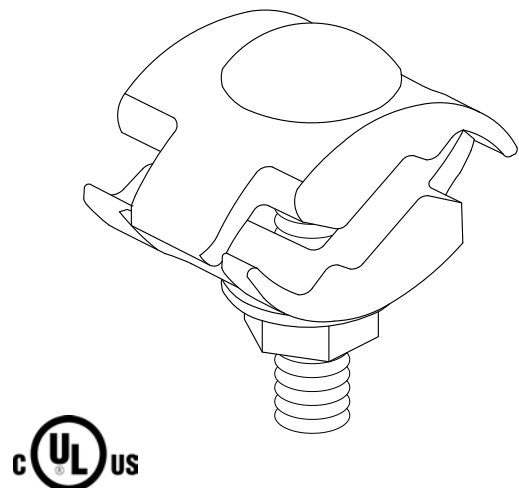


## SECONDARY PARALLEL SPLICE

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
SPSA	Copper Alloy	10	1
SPSC	Aluminum	10	2

**Notes:**

- Single bolt clamp provides 1" of contact with conductor.
- Suitable for use with conductor #6 AWG through 4/0.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



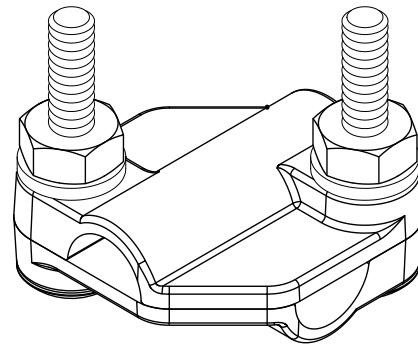


# CROSS RUN CONNECTOR

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
CRCC	Copper Alloy	10	4
CRCA	Aluminum	10	2
CRCB	Bi-Metal	10	2

**Notes:**

- Two-bolt, two-piece clamp creates a perpendicular cross connection between conductors.
- Provides 1-1/2" of contact with conductor.
- Suitable for use with all Class I and II conductors.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.

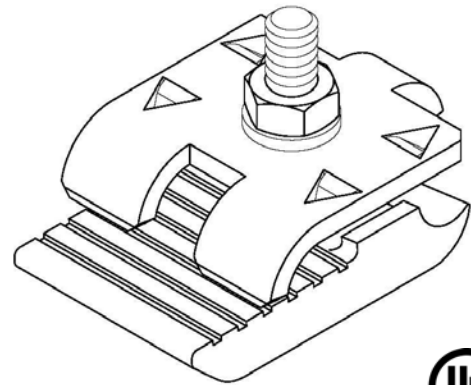


# FLANGE BONDING CLAMP

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
FBCC	Copper Alloy	10	4
FBCA	Aluminum	10	2

**Notes:**

- Single-bolt, two-piece clamp connects conductor to flat metal up to 1/2" thick.
- Provides 1-1/2 square inches of contact area with metal surface.
- Suitable for use with conductor #2 AWG through 4/0.
- Suitable for use with Class I and II conductors.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



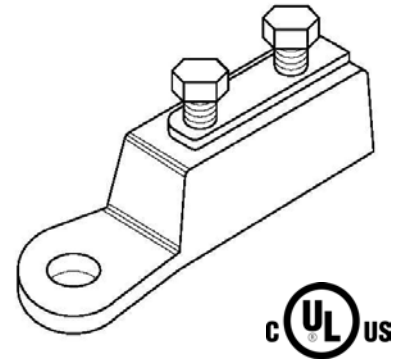
# BONDING LUGS

## SECONDARY BONDING LUG

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
SBLC	Copper Alloy	10	3
SBLA	Aluminum	10	1-1/2

**Notes:**

- Two-bolt lug secures secondary bonding conductor to metalwork.
- Provides 1-1/2 inches of contact with conductor and 2 square inches of contact between lug and mounting surface.
- Suitable for use with secondary bonding conductors.
- Available tinned. Please use suffix "T" when ordering.
- 5/16 inch mounting hole.
- Listed to UL® 96.



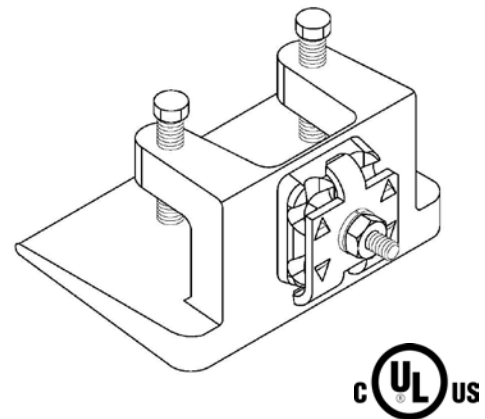
# BONDING PLATES

## BEAM BONDING CLAMP

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
BBCC	Copper Alloy	5	10
BBCA	Aluminum	5	4

**Notes:**

- Two-bolt clamp provides over 8 square inches of contact area with metal surface.
- Suitable for use with Class I and II conductors.
- Provides a 1-1/2 inch connection to conductor.
- Can be used on metalwork up to 1 inch thick.
- Available tinned. Please use suffix "T" when ordering.
- Listed to UL® 96.



# PIPE CLAMPS

## U-BOLT TYPE PIPE CLAMP TINNED COPPER

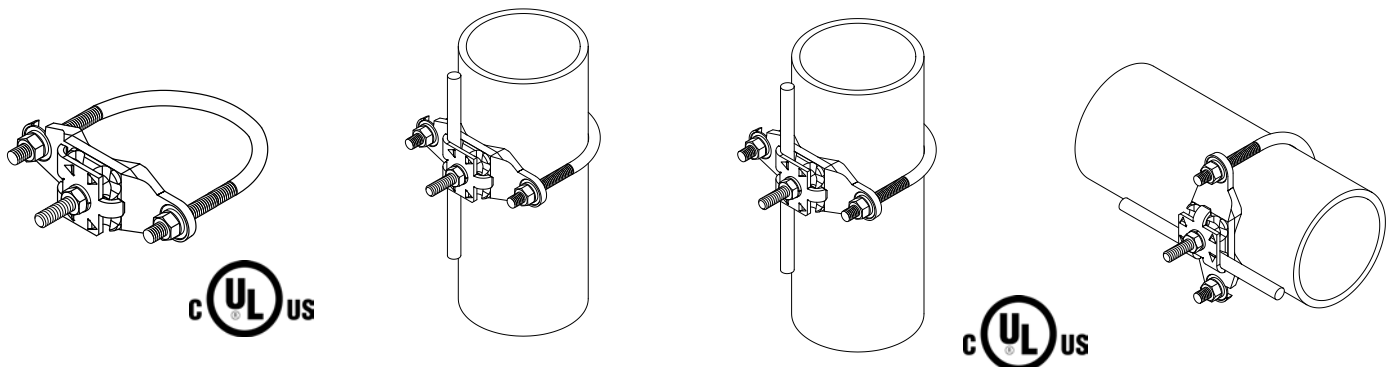
Catalog No.	Nominal Pipe Size Range (in.)	Outside Diameter Pipe Size Range (in.)	Box Qty.	Approx. Box Wt. (lbs.)
PC12T	0.5 to 1	0.5 to 1.25	5	3-3/4
PC112T	1 to 2	1 to 2.4	5	4-3/4
PC212T	2.5 to 3.5	3 to 4	5	6
PC4T	3 to 5	3.5 to 5.5	5	7-1/4
PC6T	4.5 to 6	5 to 6.5	5	10

## U-BOLT TYPE PIPE CLAMP ALUMINUM

Catalog No.	Nominal Pipe Size Range (in.)	Outside Diameter Pipe Size Range (in.)	Box Qty.	Approx. Box Wt. (lbs.)
PC12A	.5 to 1	0.5 to 1.25	5	1-3/4
PC112A	1 to 2	1 to 2.4	5	2-1/2
PC212A	2.5 to 3.5	3 to 4	5	3
PC4A	3 to 5	3.5 to 5.5	5	3-1/2
PC6A	4.5 to 6	5 to 6.5	5	4

### Notes:

- Suitable for use with Class I and II conductors.
- Provides 1-1/2 an inch connection to conductor.
- Listed to UL® 96.



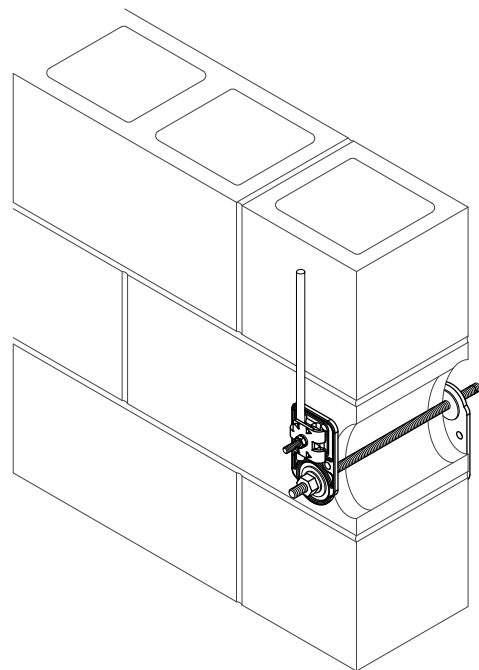
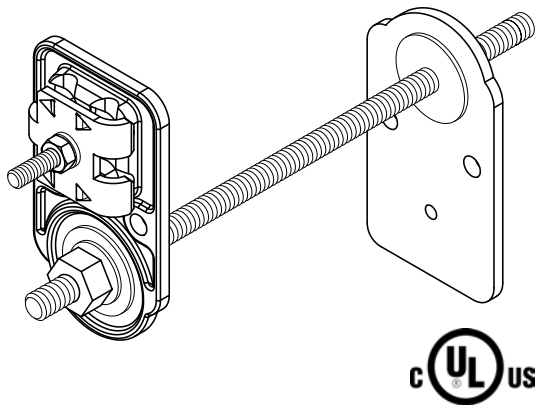
# THROUGH-ROOF/WALL CONNECTOR

## THROUGH-WALL CONNECTOR

Catalog No.	Threaded Rod Length (in.)	Connector A Material	Connector B Material	Box Qty.	Approx. Box Wt. (lbs.)
TW12C	12	Copper Alloy	Copper Alloy	5	10
TW18C	18	Copper Alloy	Copper Alloy	5	12
TW12B	12	Copper Alloy	Aluminum	5	8
TW18B	18	Copper Alloy	Aluminum	5	10
TW12A	12	Aluminum	Aluminum	5	6
TW18A	18	Aluminum	Aluminum	5	8

### Notes:

- Through-wall connectors are used to create secure, sealed connections when making roof or wall penetrations.
- Provides a weatherproof connection using neoprene sealing washers.
- Suitable for use with Class I and II conductors.
- Other lengths available.
- Listed to UL® 96.

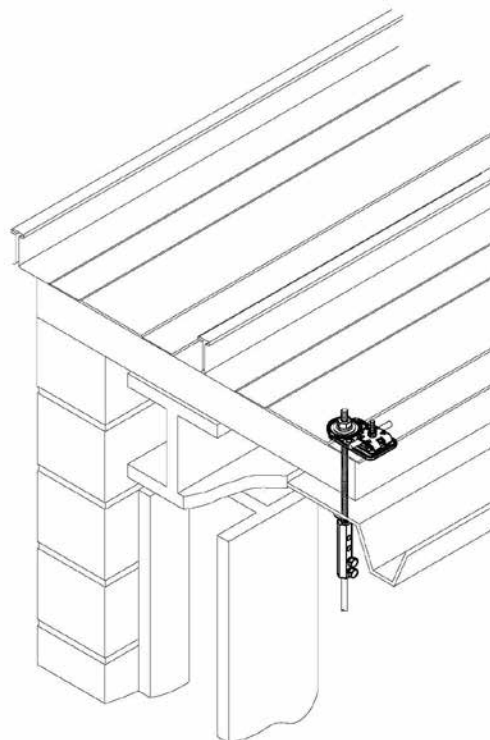
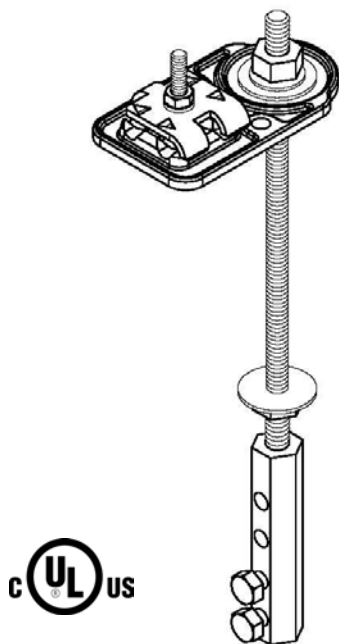


# THROUGH-ROOF CONNECTOR

Catalog No.	Threaded Rod Length (in.)	Vertical Base Material	Top Connector Material	Box Qty.	Approx. Box Wt. (lbs.)
TR12C	12	Copper Alloy	Copper Alloy	5	10
TR18C	18	Copper Alloy	Copper Alloy	5	12
TR12B	12	Copper Alloy	Aluminum	5	8
TR18B	18	Copper Alloy	Aluminum	5	10
TR12A	12	Aluminum	Aluminum	5	6
TR18A	18	Aluminum	Aluminum	5	8

## Notes:

- Through-roof connectors are used to create secure, sealed connections when making roof or wall penetrations.
- Provides a weatherproof connection using neoprene sealing washers.
- Suitable for use with Class I and II conductors.
- Other lengths available.
- Listed to UL® 96.



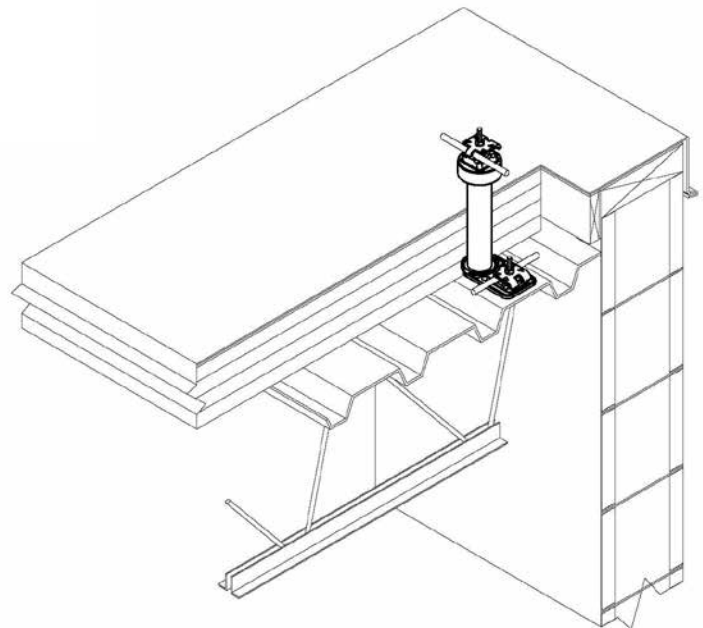
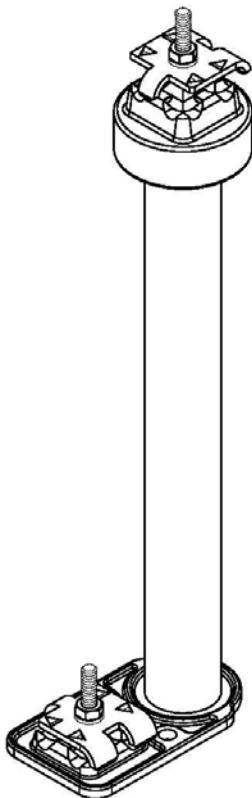
# THROUGH-ROOF/WALL CONNECTOR

## HORIZONTAL THROUGH-ROOF WITH PVC CONDUIT

Catalog No.	Nominal Conduit Size (in.)	Length (in.)	Horizontal Base Material	Top Connector Material	Approx. Wt. Each (lbs.)
TRPH24B	1-1/4	24	Copper Alloy	Aluminum	3.5

### Notes:

- Through-roof connectors are used to create secure, sealed connections when making roof penetrations.
- Provides a weatherproof connection using a solid cap with an O-ring to seal around the conduit.
- Suitable for use with Class I and II conductors.
- Other lengths available.
- Listed to UL® 96.



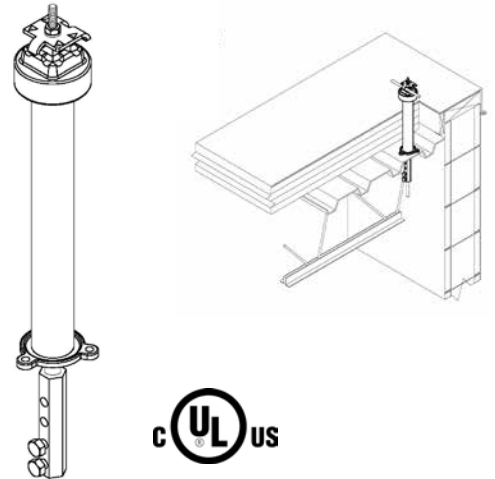
# THROUGH-ROOF/WALL CONNECTORS

## VERTICAL THROUGH-ROOF WITH PVC CONDUIT

Catalog No.	Nominal Conduit Size (in.)	Length (in.)	Horizontal Base Material	Top Connector Material	Approx. Wt. Each (lbs.)
TRPV24C	1-1/4	24	Copper Alloy	Copper Alloy	5
TRPV24B	1-1/4	24	Copper Alloy	Aluminum	4

### Notes:

- Through-roof connectors are used to create secure, sealed connections when making roof penetrations.
- Provides a weatherproof connection using a solid cap with an O-ring to seal around the conduit.
- Suitable for use with Class I and II conductors.
- Other lengths available.
- Listed to UL® 96.

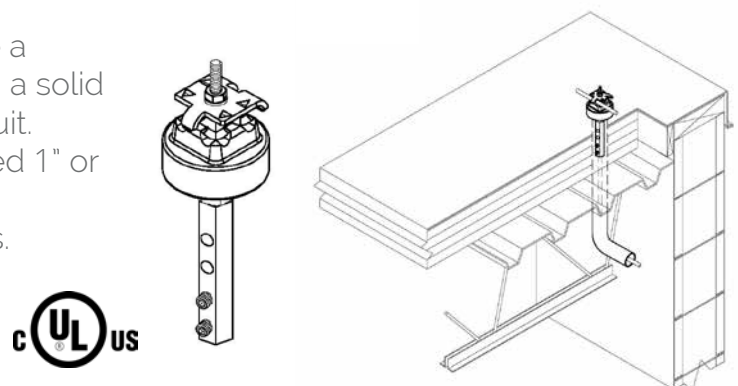


## THROUGH-ROOF CONDUIT CAP

Catalog No.	Nominal Conduit Size (in.)	Horizontal Base Material	Top Connector Material	Approx. Wt. Each (lbs.)
TRC1C	1-1/4	Copper Alloy	Copper Alloy	5
TRC114C	1-1/4	Copper Alloy	Aluminum	4
TRC1B	1	Copper Alloy	Aluminum	1
TRC114B	1-1/4	Copper Alloy	Aluminum	1
TRC1A	1	Aluminum	Aluminum	3/4
TRC114A	1-1/4	Aluminum	Aluminum	3/4

### Notes:

- Conduit cap through roof connectors provide a conductive, weatherproof connection using a solid cap with an O-ring to seal around the conduit.
- Used to install down conductor in pre-installed 1" or 1-1/4" nominal bore PVC conduit.
- Suitable for use with Class I and II conductors.
- Listed to UL® 96.



# CABLE SUPPORTS

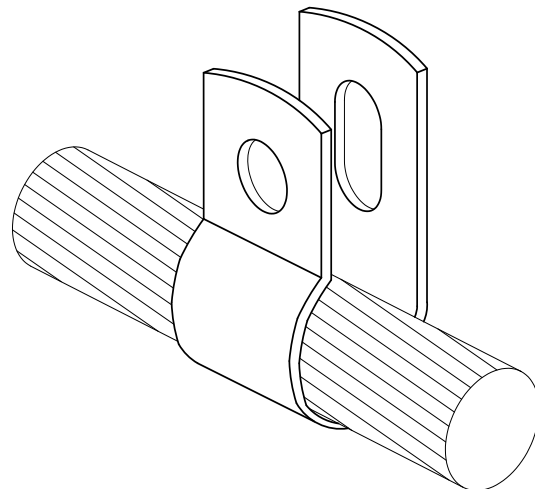
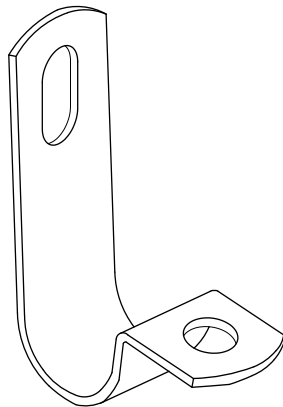
## CABLE LOOPS

SECTION **500**

Catalog No.	Material	Fits Lightning Conductors	Fits Grounding Conductors	Box Qty.	Approx. Box Wt. (lbs.)
CLSC	Copper Alloy	SC14C	4 Str., 2 Sol.	250	6
CL1C	Copper Alloy	LC2917C, LC3217C	1/0, 2/0	250	6
CL2C	Copper Alloy	LC2814C	4/0	250	6
CLSA	Aluminum	SC10A	-	250	3
CL1A	Aluminum	LC2414A	-	250	3
CL2A	Aluminum	LC2411A	-	250	3

### Notes:

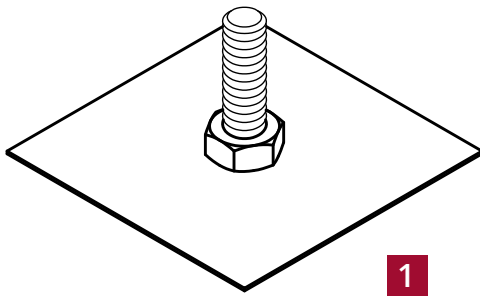
- Conductors shall be securely fastened to the structure upon which they are placed at intervals not exceeding 3 feet per NFPA 780 and UL96A.
- Mounting hole accommodates 1/4" hardware.
- Available tinned. Use suffix "T" when ordering.
- Listed to UL® 96.





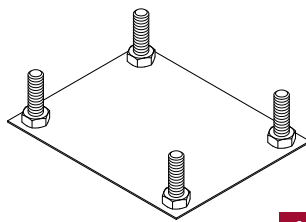
# Z-PEN

Catalog No.	Dimensions (in.)	Number of Studs	Installation Application	Unit Weight (oz.)	Primer Required (fl. oz. per 100 units)
ZP3412	1.5 x 1.5 x 0.8H	1	Cable Clips	0.6	2
ZPTKU BASE	3 x 2.375 x 0.8H	4	Universal Air Terminal Bases	2.4	3



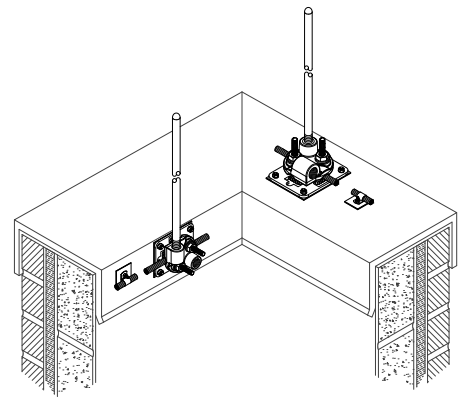
ZP3412

1



ZPTKU BASE

1



## Installation instructions:

- Install on smooth metallic surfaces at 70 to 100° F.
- Clean surface with 50:50 mix of water and Isopropyl Alcohol, then apply thin layer of ZPen primer.
- Adhere ZPen to surface, applying approximately 15 lbs. of force per square inch.

# Z-PEN PRIMER

Catalog No.	Packaging
ZP948	8 fl. oz. Bottle with Brush Lid
ZP9432	32 fl. oz. (1 Quart) Can

3M™ Tape Primer 94 is used to promote adhesion of 3M tapes to surfaces such as polyethylene, polypropylene, ABS, PET/PBT blends, concrete, wood, glass, metal and painted metal surfaces.

**1** This product may be subject to patent rights of VFC. Consult your patent attorney about your rights and responsibilities regarding patented products.

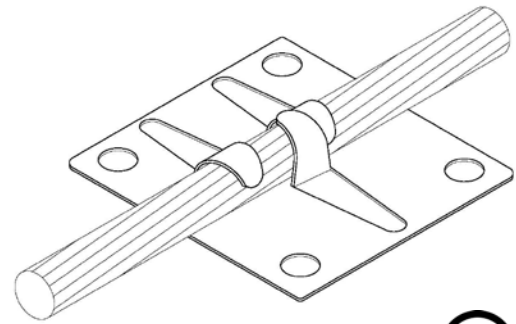
# CABLE SUPPORTS

## ADHESIVE CABLE SUPPORT

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
ASC	Copper Alloy	250	16
ASA	Aluminum	250	26

### Notes:

- Stamped cable supports are used to quickly fasten cable to surfaces without penetration.
- Use surface-compatible adhesive to secure supports to mounting surface.
- Suitable for class I and II conductors.
- Suitable for grounding conductor up to 4/0.
- Turned-up edges reduce puncturing hazard and provides increase surface adhesion.
- Available tinned. Use suffix "T" when ordering.
- Listed to UL® 96.



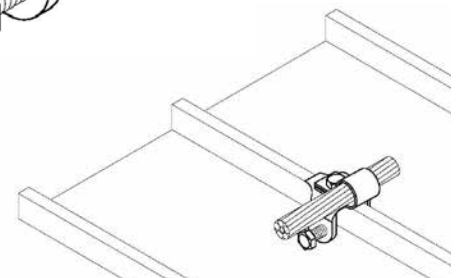
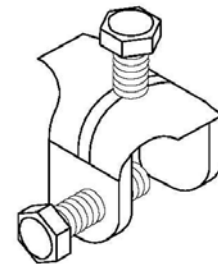
# STANDING SEAM CLAMPS

## STANDING SEAM ROOF CLAMP

Catalog No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
SSRCA	Aluminum	50	4

### Notes:

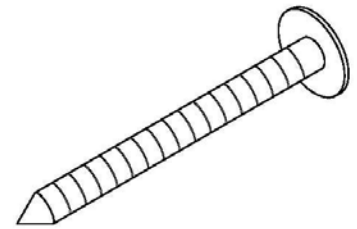
- Cast aluminum roof clamps are secured to standing seams using 1/4 inch stainless steel screws.
- Screw tips are covered with rubber caps to prevent damage to mounting surface.
- Can be used on seams up to 1/2" thick.
- Conductor is connected to these clamps using single hole cable loops, sold separately.
- Listed to UL® 96.



# FASTENING & JOINING

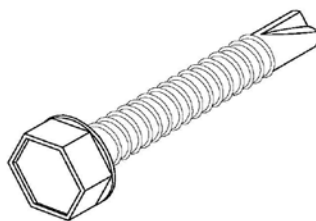
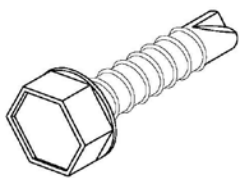
## NAILS

Catalog No.	Length (in.)	Type	Box Qty.	Approx. Box Wt. (lbs.)
N112S	1-1/2	4D, Stainless Steel, Ringed	100	3/4
N2S	2	6D, Stainless Steel, Ringed	100	1



## SELF DRILLING SCREWS

Catalog No.	Thread Size	Length (in.)	Type	Box Qty.	Approx Box Wt. (lbs.)
SMS	#10	3/4	TEKS/3	100	3/4
SSS	#12	1-1/4	TEKS/3	100	3/4



### Notes:

- Hex head screws with 410 stainless steel points are self-drilling and tapping.
- SMS can be used on sheet metal up to 1/10 inch thick (12 gauge).
- SSS can be used on structural steel up to 1/4 inch thick.

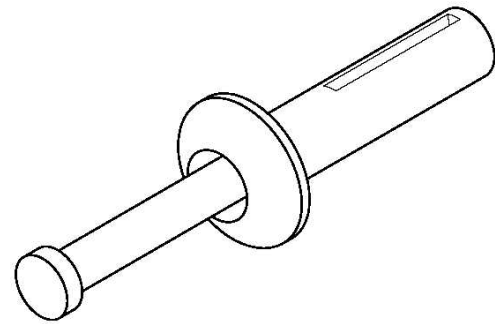
# FASTENING & JOINING

## EXPANSION ANCHORS

Catalog No.	Shank Diameter (in.)	Length (in.)	Box Qty.	Approx. Box Wt. (lbs.)
EA1S	1	3/4	100	2-1/4
EA112S	1/4	1-1/2	100	2-3/4

### Notes:

- Fast, easy to use, one piece expansion anchor.
- Comprised of a stainless steel pin and Zamac #7 body for corrosion resistant installation.
- Requires a 1/4 inch diameter mounting hole.

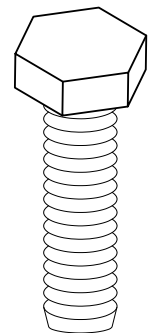


## HEX BOLTS

Catalog No.	Thread Size (in.)	Length (in.)	Box Qty.	Approx. Box Wt. (lbs.)
HB51612S	5/16	1/2	100	2
HB51634S	5/16	3/4	100	3
HB5161S	5/16	1	100	3
HB3812S	3/8	1/2	100	3
HB3834S	3/8	3/4	100	4
HB381S	3/8	1	100	5

### Notes:

- 18-8 stainless steel.
- UNC threads.

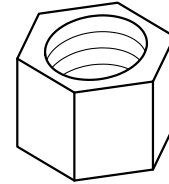


# HEX NUTS

Catalog No.	Thread Size (in.)	Box Qty.	Approx. Box Wt. (lbs.)
HN14S	1/4	100	1
HN516S	5/16	100	1-1/2
HN38S	3/8	100	1-1/2
HN12S	1/2	50	2

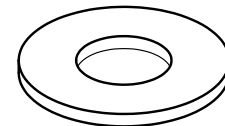
## Notes:

- 18-8 stainless steel.
- UNC threads.



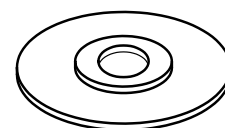
# STAINLESS STEEL FLAT WASHERS

Catalog No.	Description
W516S	5/16" I.D., 3/4" O.D.
W38S	3/8" I.D., 1" O.D.
W12S	1/2" I.D., 1-1/4" O.D.



# NEOPRENE SEALING WASHERS

Catalog No.	Description
W6L	3/8" I.D., 1-3/4" O.D.
W8L	1/2" I.D., 1-3/4" O.D.



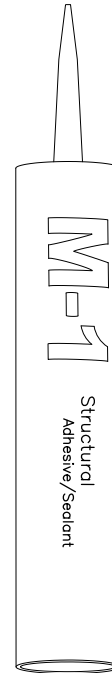
# FASTENING & JOINING

## M1 UNIVERSAL ADHESIVE/SEALANT

Catalog No.	Packaging (oz.)	Standard Color	Box Qty.	Approx. Box Wt. (lbs.)
M110	10.1	Gray	24	17
M120	20	Gray	12	22.5

### Notes:

- M-1 is a high performance, versatile, polyether formula which can be used both as an adhesive and a sealant.
- Adheres to a wide range of construction materials including: PVC, EPDM, most metals, wood, glass, masonry, concrete, fiberglass, and solvent-sensitive foam.
- Non-shrinking, solvent-free, applies down to 32°F, effective on damp surfaces, paintable, and UV stable.
- M120 requires 20 oz. size caulking gun, item #GUN20.



## 20 OZ. CAULKING GUN

Catalog No.	Materials	Unite Wt. (lbs.)
GUN20	Aluminum, Plastic	4

### Notes:

- 12:1 thrust ratio
- Double gripping plate for no slipping and long life

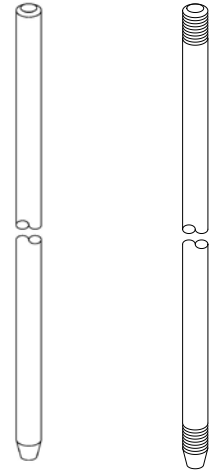
## GROUND RODS &amp; FITTINGS

**COPPER CLAD STEEL GROUND RODS**

Catalog No.	Nominal Rod Diameter (in.)	Length (ft.)	End Type	Bundle Qty.	Approx. Bundle Wt. (lbs.)
GR128C	1/2	8	Unthreaded	5	28
GR5810C	5/8	10	Unthreaded	5	43
GR3410C	3/4	10	Unthreaded	5	63
GRT3410C	3/4	10	Threaded	5	63

## Notes:

- Manufactured by molecularly bonding 99.9% pure electrolytic copper to a low carbon steel core, combining excellent corrosion resistance with high strength.
- Minimum 250 microns/10 mils of electroplated copper coating.
- Listed to UL® 467.

GROUND ROD ACCESSORIES  
**GROUND ROD COUPLER**

Catalog No.	Thread Size (in.)	Material	Box Qty.	Approx. Box Wt. (lbs.)
GRCO34C	3/4	Copper Alloy	5	2-1/2

## Notes:

- Corrosion resistant, threaded coupler for threaded sectional ground rods.
- Listed to UL® 467.



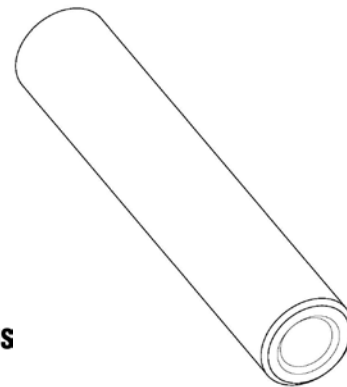
# GROUND ROD ACCESORIES

## GROUND ROD DRIVING HEAD

Catalog No.	Ground Rod Size (in.)	Qty.	Approx. Wt. Each (lbs.)
GRDH34	3/4	EA	3

**Notes:**

- Hardened steel driving stud prevents damage to the coupler or ground rod threads when driving ground rods.
- Listed to UL® 467.

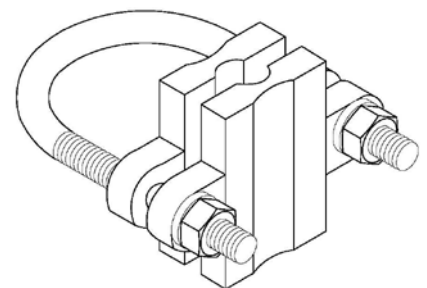


## U-BOLT GROUND ROD CLAMP

Catalog No.	Ground Rod Size (in.)	Conductor Range	Box Qty.	Approx. Box Wt. (lbs.)
GRC34C	Up through 1	#6 AWG-500 MCM	10	5

**Notes:**

- Bronze ground rod clamp features a stainless steel U-bolt for strength and corrosion resistance.
- Provides over 1-1/2 inches of contact between the ground electrode and conductors.
- Accommodates two horizontal conductors through 250 MCM.
- Accommodates one vertical conductor up to 500 MCM.
- Fits all ground rods through 1 inch diameter. Ideal for connecting down conductors to ground loop conductors.
- Listed to UL® 96 and 467.





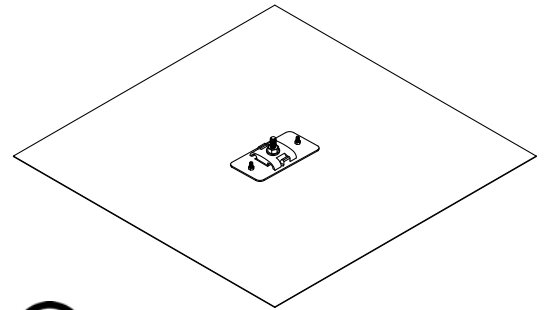
# GROUND PLATES

## COPPER GROUND PLATES

Catalog No.	Ground Plate Size (in.)	Thickness (in.)	Approx. Wt. Each (lbs.)
GP1818	18 x 18	.032	4

**Notes:**

- Copper ground plates are used in areas having little or no top soil.
- Can also be used to enhance ground grid systems.
- May be used in conjunction with earth enhancement material.
- Listed to UL® 96.



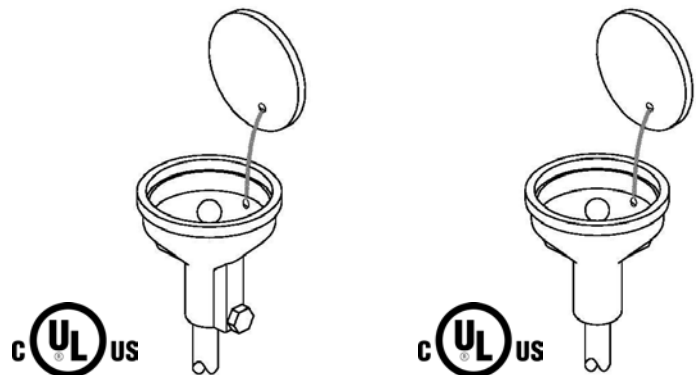
# GROUND RECEPTICALS & ACCESSORIES

## FLOOR GROUND RECEPTICALS

Catalog No.	Ground Rod Size (in.)	Connection Type	Approx. Wt. Each (lbs.)
FR34C	3/4	Set Screw	2
FRT34C	3/4	Threaded	2

**Notes:**

- Heavy duty bronze floor receptacle features a flush mount cover attached to the main body, via a stainless steel ball chain.
- Brass ball stud located inside the receptacle provides the termination point for ground clamps.
- Listed to UL® 96.



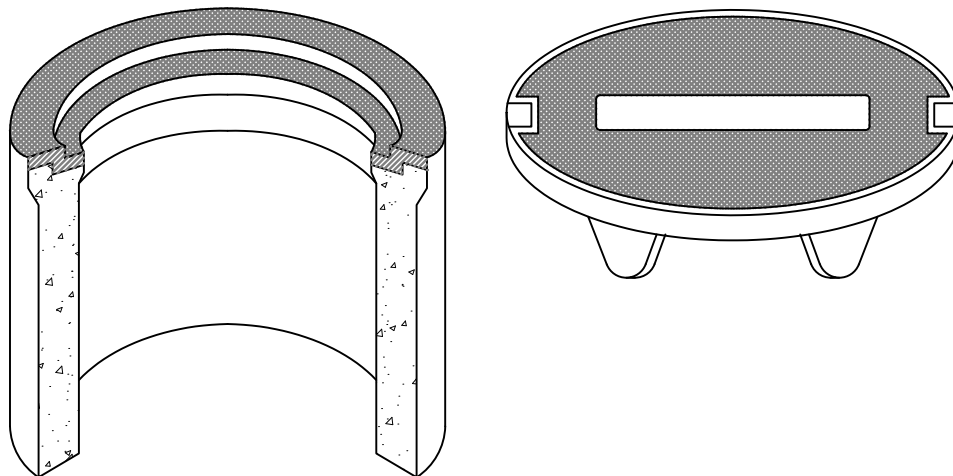
# TEST WELLS

## G5 TRAFFIC VALVE BOX

Catalog No.	Item	Description	Approx. Unit Wt. (lbs.)
G5BOX	Box	10-3/8" ID x 12" High, includes 1/4-20 x 1" bolts, 36 boxes per pallet	58
G5C	Lid	Bolt-down, cast iron lid marked "GROUND"	14
G5X12	Extension	12" Reinforced Concreted box extension, 36 per pallet	38

### Notes:

- Rated to H20 and AASHTO M309, suitable for installation in areas of continuous roadway traffic.
- Largest throat diameter for any box in its size range permits quick, easy inspections or valve adjustments, and makes this unit highly adaptable as a survey mounting box.
- Locking grade ring assures permanence and quality of surface grades. Cast iron lid and ring design reduces the danger of lid "pop-out" in high traffic areas. Vandal-resistant fasteners available as required.

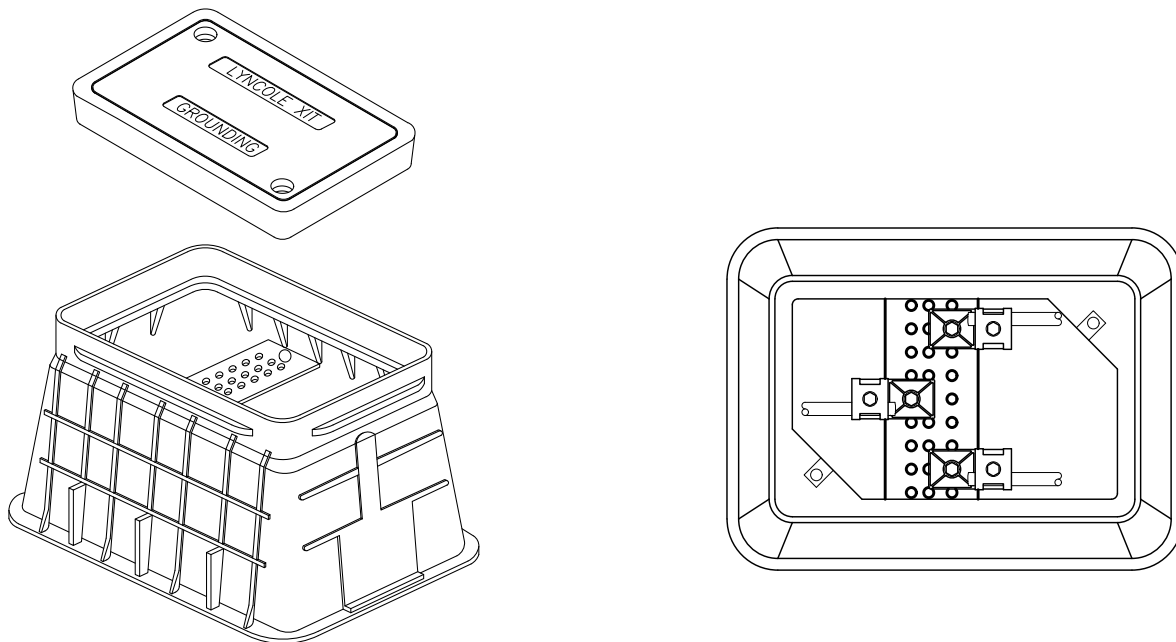


# TRUE TEST WELL

Catalog No.	Weight with Lid	Material	Live Load Rating (PSF)	Opening Dimensions (in.)
XB36FTTW	31 lb.	Fibrelyte	16,000	14 (L), 8 3/4 (W) and 12 (D)

## Notes:

- Fibrelyte is a proven polyester pre-mix with calcium carbonate and polyester resins interlaced with fiberglass and ultraviolet inhibitors.
- Fibrelyte is durable and made from noncombustible materials.
- Fibrelyte is stronger than pre-cast concrete and it exceeds WUC 3.6 recommendations for 10,000 LBS wheel loading.
- Flexural Strength: 6,000 PSI, Tensile Strength: 6,000 PSI, Compressive Strength: 20,000 PSI.
- *True Test Well* is a one of a kind, US manufactured, test well with integrated UL Listed bus bar. It allows for a complete disconnection between the electrical service and your grounding system to allow for actual systems to ground resistance testing.



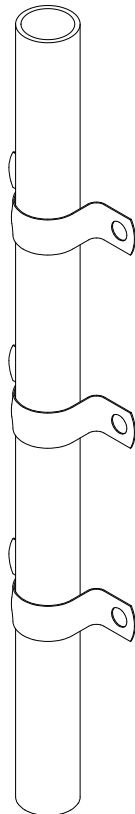
# ACCESSORIES

## PVC CABLE GUARD

Catalog No.	Nominal Size	OD (in.)	ID (in.)	Length (ft.)	Approx. Unit Wt. (lbs.)
CG1P	1	1.315	1.004	10	3.27

### Notes:

- Used in areas where conductor must be protected against damage.
- Durable, UV stabilized, schedule 40 PVC rigid conduit.
- Accommodates grounding cable up to 500MCM and LP conductor up to Class II.
- Other sizes and materials available.
- Includes 3 zinc-plated, one-hole straps.



# EXOTHERMIC WELDING

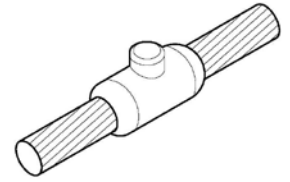
## CABLE TO CABLE CONNECTIONS

SECTION **700**

### CC1 MOLD

#### IN-LINE SPLICE CONNECTION

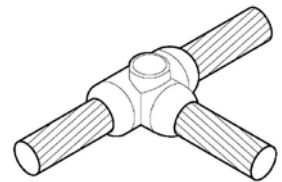
End to end splice of same cables.  
Concentric stranded copper cable unless otherwise noted.



### CC2 MOLD

#### HORIZONTAL TEE CONNECTION

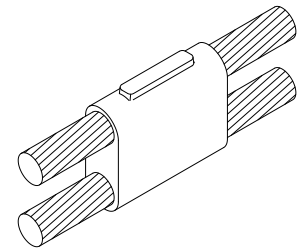
Tee of horizontal run and tap cables.  
Concentric stranded copper cable unless otherwise noted.  
Solid conductor can be either copper or copper-clad steel.



### CC7 MOLD

#### PARALLEL CONNECTION

Parallel cable to cable.  
Concentric stranded copper cable unless otherwise noted.

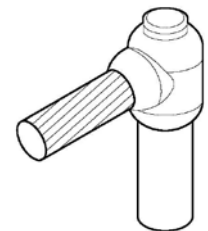


## CABLE TO GROUND ROD CONNECTIONS

### CR1 MOLD

#### CABLE TO GROUND ROD

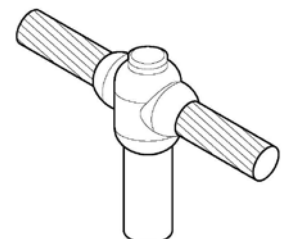
Single cable to top of ground rod.  
Concentric stranded cable unless otherwise noted. For copper clad, galvanized, stainless clad or stainless steel ground rods.



### CR2 MOLD

#### THROUGH CABLE TO GROUND ROD

Through cable to top of ground rod.  
Concentric stranded cable unless otherwise noted. For copper clad, galvanized, stainless clad or stainless steel ground rods.



# EXOTHERMIC WELDING

## CABLE TO VERTICAL STEEL CONNECTIONS

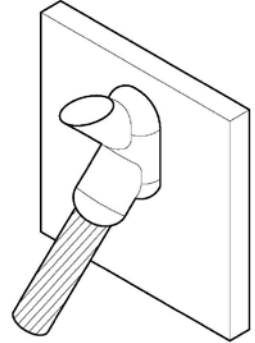
### CS3 MOLD

#### VERTICAL STEEL SURFACE

Connection of vertical cable to vertical flat steel surface or to side of vertical or horizontal steel pipe.

A test weld should be made to check the possibility of burn through on thin sections or thin wall pipe.

Concentric stranded copper cable unless otherwise noted.



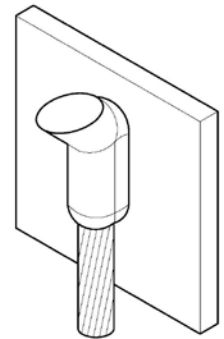
### CS23 MOLD

#### VERTICAL STEEL SURFACE

Connection of vertical cable to vertical flat steel surface or to side of vertical or horizontal steel pipe.

A test weld should be made to check the possibility of burn through on thin sections or thin wall pipe.

Concentric stranded copper cable unless otherwise noted.

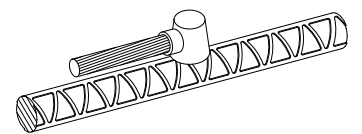


### REBAR MOLD

#### CABLE TO REINFORCING BAR

Connection of cable to reinforcement bar.

Concentric stranded copper cable unless otherwise noted.



## WELD POWDERS

Weld powders are contained in plastic cartridges, and are packed in plastic boxes of 10 or 20, depending on their size. Different joints require different powder sizes, and the size relates to the powder's nominal weight in grams. The weld powder packaging also contains retaining discs and starting powder. The retaining discs are contained in a separate bag within the box. Each weld uses one disc. The starting powder is compacted into the bottom of the cartridge, underneath the weld powder, and is released by tapping the cartridge base firmly. Blackburn® weld powders are suitable for making connections from copper to copper and from copper to steel.

# CABLE TO CABLE CC1

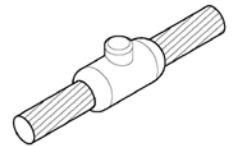
## LIGHTNING PROTECTION CABLE

Wire Size	Powder Cartridge	Part No.	Handle Clamp
28 Ropelay	65BKB	CC1-4-28	HCPK4
29 Smooth	45BKB	CC1-4-29	HCPK4
32 Smooth	65BKB	CC1-4-32	HCPK4

## GROUNDING CABLE

1/0	45BKB	CC1-4-1/0	HCPK4
2/0	65BKB	CC1-4-2/0	HCPK4
4/0	90BKB	CC1-4-4/0	HCPK4
250	115BKB	CC1-4-250K	HCPK4

Molds for other cable sizes and combinations can be manufactured on request.



# CABLE TO CABLE CC2

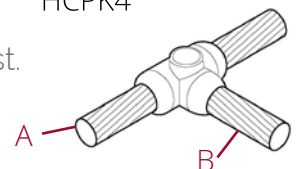
## LIGHTNING PROTECTION CABLE

Wire Size A	Wire Size B	Powder Cartridge	Part No.	Handle Clamp
28 Ropelay	28 Ropelay	90BKB	CC2-4-2828	HCPK4
29 Smooth	29 Smooth	90BKB	CC2-4-2929	HCPK4
28 Ropelay	29 Smooth	90BKB	CC2-4-2829	HCPK4
32 Smooth	32 Smooth	90BKB	CC2-4-3232	HCPK4
29 Smooth	32 Smooth	90BKB	CC2-4-2932	HCPK4
32 Smooth	29 Smooth	90BKB	CC2-4-3229	HCPK4

## GROUNDING CABLE

#2Str	#2Str	45BKB	CC2-4-#2#2	HCPK4
1/0	1/0	90BKB	CC2-4-1/01/0	HCPK4
2/0	2/0	90BKB	CC2-4-2/02/0	HCPK4
3/0	3/0	115BKB	CC2-4-3/03/0	HCPK4
4/0	4/0	150BKB	CC2-4-4/04/0	HCPK4
250	250	150BKB	CC2-4-250K250K	HCPK4
250	4/0	150BKB	CC2-4-250K4/0	HCPK4
4/0	250	150BKB	CC2-4-4/0250K	HCPK4

Molds for other cable sizes and combinations can be manufactured on request.



# EXOTHERMIC WELDING

## CABLE TO GROUND ROD CR1

Ground Rod Ø (in.)	Wire Size	Powder Cartridge	Part No.	Handle Clamp
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### LIGHTNING PROTECTION CABLE

5/8	28 Ropelay	90BKB	CR1-4-62528	HCPK4
5/8	29 Smooth	90BKB	CR1-4-62529	HCPK4
5/8	32 Smooth	90BKB	CR1-4-62532	HCPK4
3/4	28 Ropelay	90BKB	CR1-4-75028	HCPK4
3/4	29 Smooth	90BKB	CR1-4-75029	HCPK4
3/4	32 Smooth	90BKB	CR1-4-75032	HCPK4

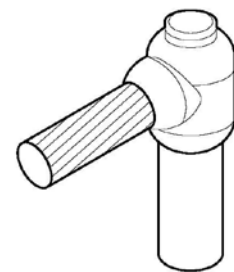
### GROUNDING CABLE

5/8	4/0	90BKB	CR1-4-6254/0	HCPK4
5/8	250	90BKB	CR1-4-625250K	HCPK4
3/4	1/0	90BKB	CR1-4-7501/0	HCPK4
3/4	2/0	90BKB	CR1-4-7502/0	HCPK4
3/4	4/0	90BKB	CR1-4-7504/0	HCPK4
3/4	250	90BKB	CR1-4-750250K	HCPK4

CR1 and CR2 are suitable for connections to copperbond rods – for connections to copper or stainless steel rods, please contact our sales office. Threaded portion of rod should be removed before welding.

Molds for other cable sizes and configurations can be manufactured on request. Special designs for all exothermic welding molds available on request.

For many more applications contact us for part numbers and pricing.





# CABLE TO GROUND ROD CR2

Ground Rod Ø (in.)	Wire Size	Powder Cartridge	Part No.	Handle Clamp
-----------------------	-----------	------------------	----------	--------------

## LIGHTNING PROTECTION CABLE

5/8	28 Ropelay	115BKB	CR2-4-62528	HCPK4
5/8	29 Smooth	115BKB	CR2-4-62529	HCPK4
5/8	32 Smooth	115BKB	CR2-4-62532	HCPK4
3/4	28 Ropelay	115BKB	CR2-4-75028	HCPK4
3/4	32 Smooth	115BKB	CR2-4-75032	HCPK4

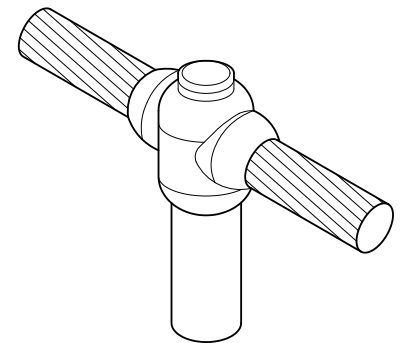
## GROUNDING CABLE

5/8	4/0	115BKB	CR2-4-6254/0	HCPK4
5/8	250	150BKB	CR2-4-625250K	HCPK4
3/4	1/0	115BKB	CR2-4-7501/0	HCPK4
3/4	2/0	115BKB	CR2-4-7502/0	HCPK4
3/4	4/0	115BKB	CR2-4-7504/0	HCPK4
3/4	250	150BKB	CR2-4-750250K	HCPK4

CR1 and CR2 are suitable for connections to copperbond rods – for connections to copper or stainless steel rods, please contact our sales office. Threaded portion of rod should be removed before welding.

Molds for other cable sizes and configurations can be manufactured on request. Special designs for all exothermic welding molds available on request.

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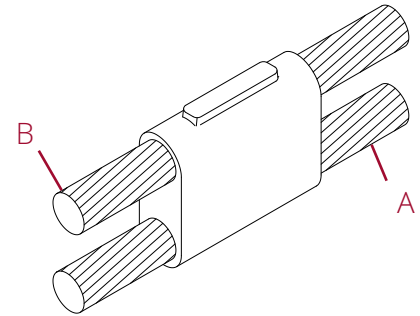


# EXOTHERMIC WELDING

## CABLE TO CABLE CC7

Wire Size A	Wire Size B	Powder Cartridge	Part No.	Handle Clamp
28 Ropelay	28 Ropelay	115BKB	CC7-4-2828	HCPK4
28 Ropelay	4/0	150BKB	CC7-4-4/028	HCPK4
4/0	4/0	200BKB	CC7-4-4/04/0	HCPK4

Molds for other cable sizes and combinations can be manufactured on request.



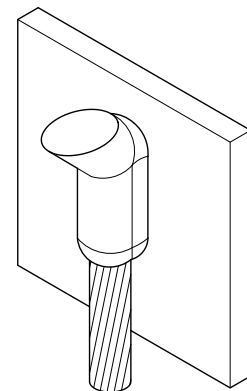
## CABLE TO STEEL SURFACE CS23

Wire Size A	Powder Cartridge	Part No.	Handle Clamp
<b>LIGHTNING PROTECTION CABLE</b>			
28 Ropelay	150BKB	CS23-4-28	HCPK4
29 Smooth	150BKB	CS23-4-29	HCPK4
32 Smooth	150BKB	CS23-4-32	HCPK4

### GROUNDING CABLE

2/0	150BKB	CS23-4-2/0	HCPK4
4/0	200BKB	CS23-4-4/0	HCPK4

Molds for other cable sizes and combinations can be manufactured on request.



# CABLE TO REINFORCING BAR CRE1

Reinforcing Bar Size A	Wire Size B	Powder Cartridge	Part No.	Handle Clamp	Packing
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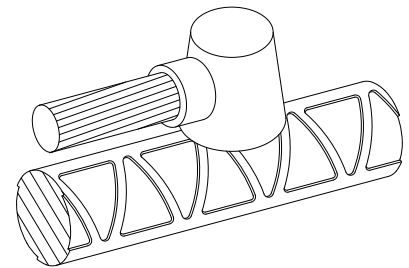
## LIGHTNING PROTECTION CABLE

4 to 7	28 Ropelay	90BKB	CRE1-3-28Z	HCPK3B	PACK-A 1
4 to 7	29 Ropelay	90BKB	CRE1-3-29Z	HCPK3B	PACK-A 1
8 to 11	28 Ropelay	90BKB	CRE1-3-28Y	HCPK3B	PACK-A 1
8 to 11	29 Ropelay	90BKB	CRE1-3-29Y	HCPK3B	PACK-A 1

## GROUNDING CABLE

4 to 7	4/0	115BKB	CRE1-3-4/0Z	HCPK3B	PACK-A 1
8 to 11	4/0	115BKB	CRE1-3-4/0Y	HCPK3B	PACK-A 1

Molds for other cable sizes and configurations can be manufactured on request. Special designs for all exothermic welding molds available on request.



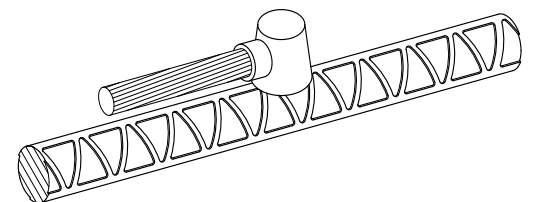
# EXOTHERMIC REBAR GROUNDING ASSEMBLIES

## REBAR GROUNDING ASSEMBLIES

Catalog No.	Rebar Size	Conductor Type	Conductor Length (in.)	Approx. Wt. (lbs.)
RGKIT4/0C	8	4/0	36	2-1/2

### Notes:

- This prefabricated assembly is comprised of conductor exothermically welded to a 24" length of rebar.
- Facilitates a fast and easy field connection.
- Can be wire tied or welded to rebar cage prior to concrete pour.
- Conductor can be stubbed out for connection to a download or ground grid.
- Other sizes are available.



# EARLY STREAMER EMISSION (ESE) AIR TERMINALS

## OPR ESE HEADS

SECTION **800**

Catalog no.	$\Delta T$ ( $\mu s$ )	Weight (lbs)
OPR 30	30	5.29
OPR 45	45	5.29
OPR 60	60	5.29

### Notes:

- Mast to be ordered separately.
- Maximum operating temperature: 120 °C (248 °F).
- Typical applications:
  - Industrial sites, buildings, warehouses, where a large protection area is needed.

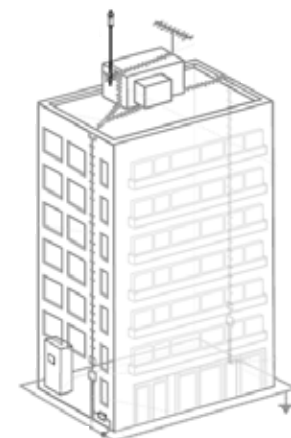


## CALCULATING PROTECTED AREAS

The radius of protection RP of an OPR is given by French standard NF C 17-102 (September 2011 edition) and ABB Standards and Guidelines, lightning protection system with Early Streamer Emission Air Terminal (ESEAT).

It depends on the ESEAT efficiency T of the OPR measured in the high voltage laboratory, on the levels of protection I, II, III or IV calculated according to the lightning risk assessment guides or standards (NF C 17-102 Annex A or IEC 62305-2, ABB Standards and Guidelines, lightning protection system with Early Streamer Emission Air Terminal, and on the height H of the lightning air terminal over the area to be protected (minimum height = 2 m).

The protection radius is calculated according to Annex C in French standard NF C 17-102. For OPR 60, limiting the value of T used in the protection radius calculations to 60  $\mu s$  (limited 60  $\mu s$  in accordance with the paragraph 5.2.2 of the NF C 17-102 standard).



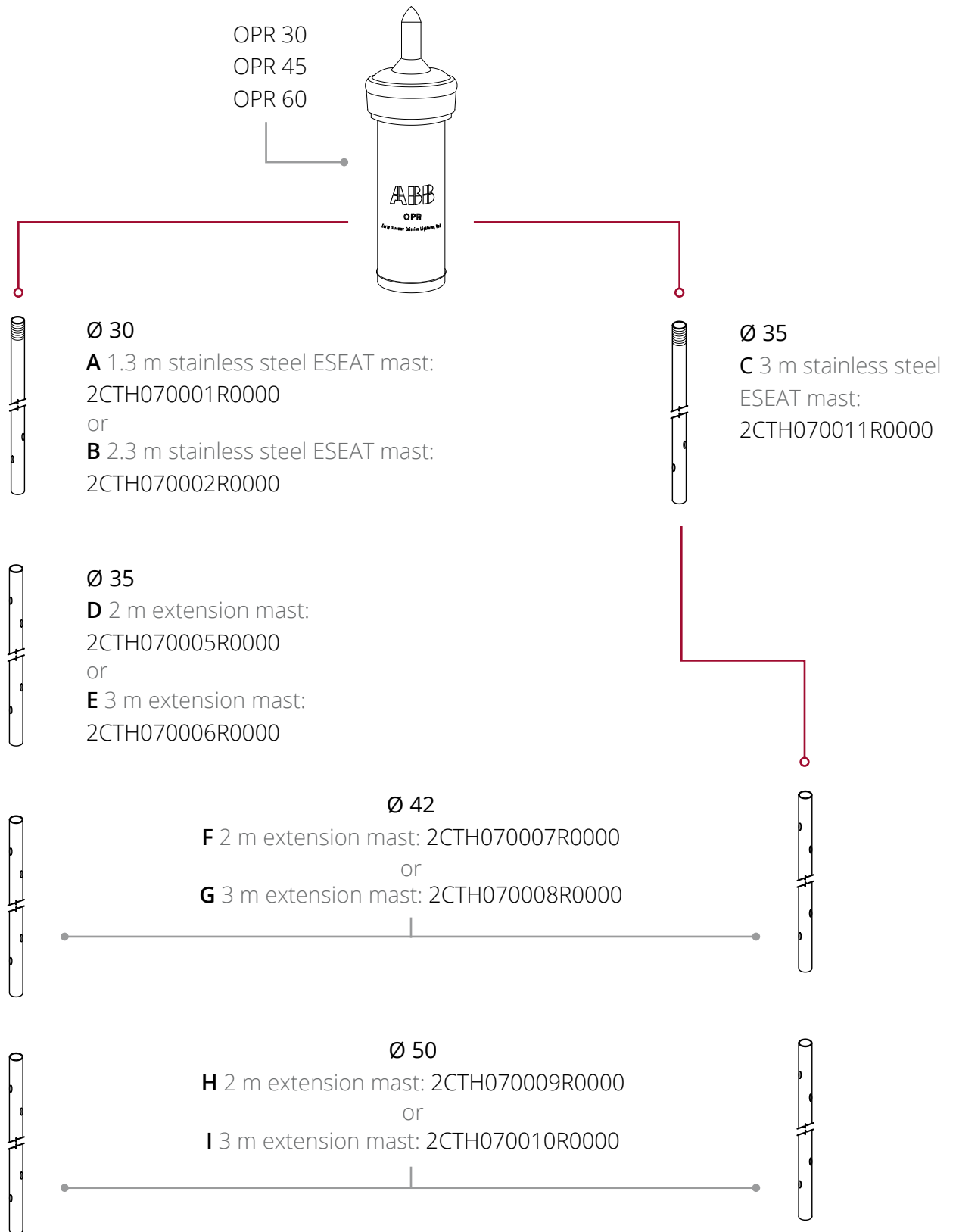
	LPL I	LPL II	LPL III	LPL IV
Rolling sphere radius r(m)	20	30	45	60

# OPR RADIUS OF PROTECTION

Level of Protection	I (r = 20 m)			II (r = 30 m)			III (r = 45 m)			IV (r = 60 m)		
Type	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60
h (m)	Radius of protection Rp (m)											
2	19	25	31	22	28	35	25	32	39	28	36	43
3	29	38	47	33	42	52	38	48	58	43	57	64
4	38	51	63	44	57	69	51	65	78	57	72	85
5	<b>48</b>	<b>63</b>	<b>79</b>	<b>55</b>	<b>71</b>	<b>86</b>	<b>63</b>	<b>81</b>	<b>97</b>	<b>71</b>	<b>89</b>	<b>107</b>
6	48	63	79	55	71	87	64	81	97	72	90	107
8	49	64	79	56	72	87	65	82	98	73	91	108
10	49	64	79	57	72	88	66	83	99	75	92	109
15	50	65	80	58	73	89	69	85	101	78	95	111
20	50	65	80	59	74	89	71	86	102	81	97	113
45	43	65	76	58	75	89	75	90	105	89	104	119
50	40	65	74	57	75	88	75	90	105	89	104	120
55	36	65	72	55	75	86	74	90	105	90	105	120
60	30	65	69	52	75	85	73	90	104	90	105	120

The optimized radius of protection is reached when placing the ESE lightning conductor at 5 m above the highest point of the structure to protect. A minimum of 2 m is a must.

# ESE MAST SELECTION GUIDE



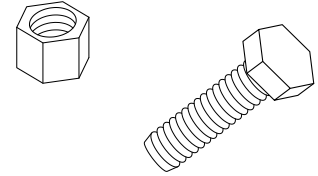
# MASTS AND EXTENSION MASTS

## EXTENSION MAST FASTENER KITS

Catalog No.	Description
OPR-SK	4 Nuts and 4 Bolts to connect ø 30 to ø 35 and ø 35 to ø 42 masts
OPR-SK4250	2 Nuts and 2 Bolts to connect ø 42 to ø 50 masts

### Notes:

- 18-8 Stainless Steel.
- UNC Threads.



## MAST CONFIGURATION GUIDE

Nominal Height (m)	Mast Combination	ESEAT Mast Type	Extension Mast Type
<b>BELOW 140 KM/H (87MPH)</b>			
4.5	B + D	<b>B</b> 2CTH070002R0000	<b>D</b> 2CTH070005R0000
5.2	C + D	<b>C</b> 2CTH070011R0000	<b>D</b> 2CTH070005R0000
6.2	C + E	<b>C</b> 2CTH070011R0000	<b>E</b> 2CTH070006R0000
7.2	C + D + F	<b>C</b> 2CTH070011R0000	<b>D</b> 2CTH070005R0000 + <b>F</b> 2CTH0700007R0000
<b>UP TO 170 KM/H (105 MPH)</b>			
4.5	B + D	<b>B</b> 2CTH070002R0000	<b>D</b> 2CTH070005R0000
5.2	C + D	<b>C</b> 2CTH070011R0000	<b>D</b> 2CTH070005R0000
6.5	B + D + F	<b>B</b> 2CTH070002R0000	<b>D</b> 2CTH070005R0000 + <b>F</b> 2CTH0700007R0000
7.2	C + D + F	<b>C</b> 2CTH070011R0000	<b>D</b> 2CTH070005R0000 + <b>F</b> 2CTH0700007R0000

For installation without guying.

# MASTS AND EXTENSION MASTS

## ESEAT MASTS

Catalog No.	Height (m)	Outside Diameter (mm)	Unit Weight (lb.)
2CTH070001R0000	1.3	30	4.2
2CTH070002R0000	2.3	30	6.6
2CTH070011R0000	3.0	35	11.5

### Notes:

- 304 Stainless Steel.
- For direct, threaded connection to ESEAT heads.



## EXTENSION MASTS

Catalog No.	Height (m)	Outside Diameter (mm)	Fastener Kit Required	Unit Weight (lb.)
2CTH070005R0000	2	35	OPR-SK	11.5
2CTH070006R0000	3	35	OPR-SK	14.1
2CTH070007R0000	2	42	OPR-SK	14.1
2CTH080008R0000	3	42	OPR-SK	21.2
2CTH080009R0000	2	50	OPR-SK4250	16.5
2CTH080010R0000	3	50	OPR-SK4250	24.3

### Notes:

- 304 Stainless Steel.
- Extension masts connect to ESEAT masts using corresponding fastener kits.





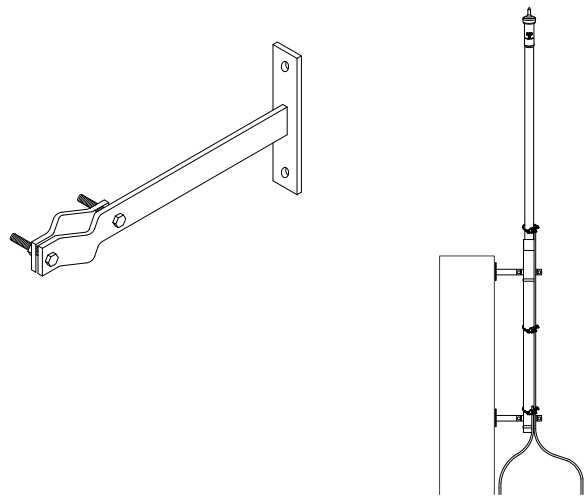
# MOUNTING ACCESSORIES

## WALL MOUNT BRACKETS

Catalog No.	Description	Offset Distance (mm)	Unit Weight (lb.)
2CTH050015R0000	Short Bolted Bracket	125	3.1
2CTH050016R0000	Long Bolted Bracket	290	4.2

**Notes:**

- Used to mount offset mast to vertical surface.
- Bolt hole diameter: 11.5 mm (fits 7/16" fastener).
- Distance between bolt holes: 120mm (4.72").

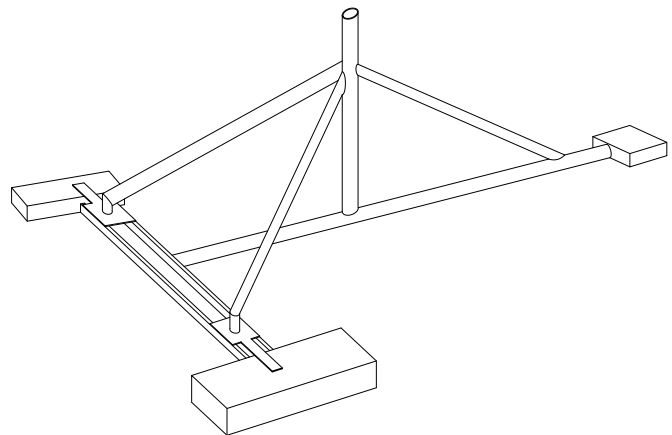


## BALLASTED TRIPODS

Catalog No.	Maximum Wind Load (mph)	Unit Weight (lb.)
2CTHCTLB5002	92	265
2CTHCTLB5004	105	441

**Notes:**

- Used to support a mast of 5m (16' 5") or less without penetrating fasteners or adhesives.
- Galvanized steel frame, concrete feet.
- Maximum roof gradient: 5%.



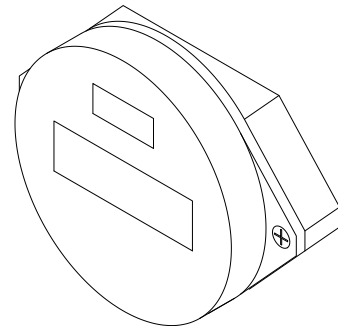
# ESE SYSTEM ACCESSORIES

## LIGHTNING STRIKE COUNTER

Catalog No.	Description	Unit Weight (lb.)
2CTH060001R0000	<b>1</b> Lightning strike counter with flat conductor connection	0.90
2CTH0CIF2006	<b>2</b> Lightning strike counter and recorder	0.75
2CTH060002R0000	<b>3</b> Lightning strike LCD counter with round or flat conductor connection	0.22

### Notes:

- Strike counters are installed in series with lightning down conductor to record lightning current.
- Counter 1 (2CTH060001R0000) uses the current induced in a secondary circuit to activate an electromechanical counter. It has been tested in high voltage laboratories and in situ.
- Counters 1 and 2 (2CTH060001R0000 & 2CTH0CIF2006 respectively) are equipped with an external dry contact.



## OPR LIGHTNING AIR TERMINAL TESTING KIT

Catalog No.	Description	Unit Weight (lb.)
2CTH080004R0000	Telescoping ESE Test Pole	13.2
2CTH080001R0000	ESE Test System	4.2

### Notes:

- The testing kit needs a contact with the OPR tip in one hand, and the bottom of the pole or the down conductor in the other hand.
- It tests the OPR electronics by activating the high-voltage internal circuit of the OPR.

# PART NUMBER INDEX

1/0C	<b>3</b>	AT1260A	<b>6</b>	CRCB	<b>22</b>	CR2-4-625250K	<b>46</b>
2/0C	<b>3</b>	AT1260C	<b>5</b>	CC1-4-1/0	<b>44</b>	CR2-4-62528	<b>46</b>
3/0C	<b>3</b>	AT1272A	<b>6</b>	CC1-4-2/0	<b>44</b>	CR2-4-62529	<b>46</b>
4/0C	<b>3</b>	AT1272C	<b>5</b>	CC1-4-250K	<b>45</b>	CR2-4-62532	<b>46</b>
27C	<b>3</b>	AT3812C	<b>4</b>	CC1-4-28	<b>45</b>	CR2-4-6254/0	<b>46</b>
47C	<b>3</b>	AT3818C	<b>4</b>	CC1-4-29	<b>45</b>	CR2-4-750250K	<b>46</b>
67C	<b>3</b>	AT3824C	<b>4</b>	CC1-4-32	<b>45</b>	CR2-4-75028	<b>46</b>
250C	<b>3</b>	AT3836C	<b>4</b>	CC1-4-4/0	<b>45</b>	CR2-4-75032	<b>46</b>
500C	<b>3</b>	AT3848C	<b>4</b>	CC2-4-#2#2	<b>44</b>	CR2-4-7504/0	<b>46</b>
2CTH050015R0000	<b>54</b>	AT3860C	<b>4</b>	CC2-4-1/01/0	<b>44</b>	CRE1-3-28Z	<b>48</b>
2CTH050016R0000	<b>54</b>	AT5812A	<b>7</b>	CC2-4-2/02/0	<b>44</b>	CRE1-3-29Z	<b>48</b>
2CTH060001R0000	<b>55</b>	AT5818A	<b>7</b>	CC2-4-250K250K	<b>44</b>	CRE1-3-28Y	<b>48</b>
2CTH060002R0000	<b>55</b>	AT5824A	<b>7</b>	CC2-4-250K4/0	<b>44</b>	CRE1-3-29Y	<b>48</b>
2CTH070001R0000	<b>52</b>	AT5836A	<b>7</b>	CC2-4-2828	<b>44</b>	CRE1-3-4/0Z	<b>48</b>
2CTH070002R0000	<b>52</b>	AT5848A	<b>7</b>	CC2-4-2829	<b>44</b>	CRE1-3-4/0Y	<b>48</b>
2CTH070005R0000	<b>52</b>	AT5860A	<b>7</b>	CC2-4-2932	<b>44</b>	CS23-4-2/0	<b>47</b>
2CTH070006R0000	<b>52</b>	AT5872A	<b>7</b>	CC2-4-2929	<b>44</b>	CS23-4-4/0	<b>47</b>
2CTH070007R0000	<b>52</b>	ATE1224C	<b>11</b>	CC2-4-3229	<b>44</b>	EA112S	<b>33</b>
2CTH070011R0000	<b>52</b>	ATE1224A	<b>11</b>	CC2-4-3232	<b>44</b>	EA1S	<b>33</b>
2CTH080008R0000	<b>52</b>	ASC	<b>29</b>	CC2-4-4/0250K	<b>44</b>	EC12A	<b>11</b>
2CTH080009R0000	<b>52</b>	ASA	<b>29</b>	CC2-4-4/04/0	<b>44</b>	EC12C	<b>11</b>
2CTH080010R0000	<b>52</b>	BBCA	<b>23</b>	CC7-4-2828	<b>47</b>	FA12FFA	<b>9</b>
2CTH080004R0000	<b>55</b>	BBCC	<b>23</b>	CC7-4-4/028	<b>47</b>	FA12FFC	<b>9</b>
2CTH080001R0000	<b>55</b>	BST10	<b>8</b>	CC7-4-4/04/0	<b>47</b>	FA12FMA	<b>9</b>
2CTH0CIF2006	<b>55</b>	CB12A	<b>16</b>	CC7-4-2828	<b>47</b>	FA12FMC	<b>9</b>
2CTHCTLB5002	<b>54</b>	CB12C	<b>16</b>	CC7-4-4/028	<b>47</b>	FA58FFA	<b>9</b>
2CTHCTLB5004	<b>54</b>	CB18A	<b>16</b>	CC7-4-4/04/0	<b>47</b>	FA58FFC	<b>9</b>
AT1212C	<b>5</b>	CB18C	<b>16</b>	CR1-4-625250K	<b>45</b>	FBCC	<b>22</b>
AT1212A	<b>6</b>	CG1P	<b>41</b>	CR1-4-62528	<b>45</b>	FBCA	<b>22</b>
AT1218C	<b>5</b>	CL1A	<b>29</b>	CR1-4-62529	<b>45</b>	FM10	<b>8</b>
AT1218A	<b>6</b>	CL2A	<b>29</b>	CR1-4-62532	<b>45</b>	FM20	<b>8</b>
AT1224A	<b>6</b>	CL1C	<b>29</b>	CR1-4-6254/0	<b>45</b>	FR34C	<b>38</b>
AT1224C	<b>5</b>	CL2C	<b>29</b>	CR1-4-75028	<b>45</b>	FRT34C	<b>38</b>
AT1236A	<b>6</b>	CLSA	<b>29</b>	CR1-4-75029	<b>45</b>	G5BOX	<b>39</b>
AT1236C	<b>5</b>	CLSC	<b>29</b>	CR1-4-75032	<b>45</b>	G5C	<b>39</b>
AT1248A	<b>6</b>	CRCC	<b>22</b>	CR1-4-7504/0	<b>45</b>	G5X12	<b>39</b>
AT1248C	<b>5</b>	CRCA	<b>22</b>	CR1-4-750250K	<b>45</b>	GR128C	<b>36</b>



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