HARGER

Master Equipment Catalog

grounding | exothermic | lightning protection









Introduction

Since its beginning in 1960, Harger Lightning & Grounding has become a leader in the grounding and lightning protection industries. Founded on the principles of honesty, integrity and technical expertise, Harger has been able to provide grounding solutions and lightning protection equipment for many satisfied customers.

Harger Lightning & Grounding has built its reputation on providing a broad line of quality products at a competitive price, coupled with extraordinary service.

We have experience in all facets of these markets including engineering, systems design, product manufacturing and installation. We have the staff and facilities to handle your special requirements.

Our complete engineering and manufacturing facilities have the capacity to produce special items as well as modify our standard component line. Let us know the application and we can provide the necessary equipment.

In order to meet the rigorous demands of our markets, Harger maintains an extensive inventory to ensure prompt deliveries to our customers, domestically and worldwide. Located near Chicago, Illinois, Harger is centrally located to serve the needs of customers from coast to coast.

HARGER UNIVERSITY

Factory Training & Certification Programs

Lightning Protection Installation Training

This course covers the fundamentals of Lightning Protection Installation, focusing on the design, materials, and skills needed to perform ground work and rooftop installations across various structures. It ensures installers achieve full compliance with NFPA 780 standards, including bonding requirements and potential equalization.

- Manufacturers Certification provided upon completion
- Offered in both In Person in Grayslake, IL or Virtually

Ultraweld Exothermic Welding

This hands-on training taught by industry professionals and can be performed in a classroom or on the jobsite. Trainees will obtain the necessary skills to safely, efficiently and correctly perform Ultraweld Exothermic welding connections.

- 3-year Manufacturers Certification provided upon completion

HarGround High Compression

This hands-on training taught by industry professionals and can be performed in a classroom or on the jobsite. Trainees will obtain the necessary skills to safely, efficiently and correctly perform HarGround 12-Ton compression connections.

- 3-year Manufacturers Certification provided upon completion

Harger has created a series of innovative apps that are designed to make your job easier and more productive. They are available on Harger.com.

GROUNDING APPS

Ground Bar Selector - Select available options, such as length, width, height, and hole pattern to generate a Harger part number.

HarGround Selector - Select connector style, the components, and be provided the Harger part number and associated dies for high-compression applications.

UltraFill Calculator - Provides the quantity of Ultrafill material required based on project specifications and packaging preference.

LIGHTNING PROTECTION APPS

Component Spacing - This tool assists lighting protection installers and engineers in determining the spacing for air terminals/bases and cable holders to ensure consistent spacing while maintaining compliance to NFPA 780/UL96A requirements.

Risk Sideflash Bonding - This tool assists lighting protection installers and engineers in determining the whether a grounded metal body, such as a roof drain or metallic pipe, must be bonded to the lightning protection system to minimize the risk of sideflash.

Risk Assessment Calculator - This tool assists building owners, engineers/architects and safety professionals in determining the risks of damage and potential need for lightning protection based on guidance from NFPA 780.

Zone of Protection - This tool assists designers, engineers and installers in determining air terminal coverage and placement based on NFPA 780.

EXOTHERMIC APP

Ultraweld Tech Support - Through a series of questions, this tool will help customers resolve field issues when using Ultraweld Exothermic welding products.

Harger Apps

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Grounding Components

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UL Standards

83: Thermoplastic-Insulated Wires and Cable

96: Lightning Protection Components

467: Grounding and Bonding Components

486: Standard of Safety for Wire Connectors

c(UL)us: Indicates part is listed for use in Canada and the United States of America

Ground Conductors

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Stranded Copper Conductors
Concentric Lay Soft-Drawn Bare Copper


7 Strand Concentric


19 Strand Concentric


37 Strand Concentric


61 Strand Concentric

Part No.	Electro Tin Plated Part No.	Size (AWG)	No. of Strands	CM Area	Approx. Wt. lbs./M ft.
8-7	87T	8	7	16,510	51
6-7	67T	6	7	26,240	81
4-7	47T	4	7	41,740	127
3-7	37T	3	7	52,630	163
2-7	27T	2	7	66,360	205
2-19	2-19T	2	19	66,360	201
1-7	17T	1	7	83,690	258
1-19	119T	1	19	83,690	258
1/0-19	1/019T	1/0	19	105,600	325
2/0-7	2/07T	2/0	7	133,100	410
2/0-19	2/019T	2/0	19	133,100	410
3/0-7	3/07T	3/0	7	167,800	518
3/0-19	3/019T	3/0	19	167,800	518
4/0-7	4/07T	4/0	7	211,600	653
4/0-19	4/019T	4/0	19	211,600	653
250MCM-19	250MCM-19T	250	19	250,000	772
250MCM-37	250MCM-37T	250	37	250,000	772
350MCM-37	350MCM-37T	350	37	350,000	1,081
500MCM-37	500MCM-37T	500	37	500,000	1,544
750MCM-61	750MCM-61T	750	61	750,000	2,316
1000MCM-61	1000MCM-61T	1000	61	1,000,000	3,088

NOTES:

- Harger offers standard reel sizes, however we will cut to specified lengths. Contact factory for reel sizes/put ups.

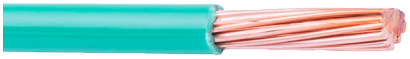
Harger's bare copper wire and cable meet or exceed the following ASTM specifications:

B-1	Hard-Drawn Copper Wire
B-2	Medium-Hard Copper Wire
B-3	Soft or Annealed Copper Wire
B-8	Concentric Lay-Stranded Hard, Medium-Hard or Soft Copper Conductor
B-33	Tinned Soft-Drawn Conductors
B-787	19 Wire Combination Unilay-Stranded Soft copper wire

Insulated Soft-Drawn Copper Conductors



7 Strand Insulated



19 Strand Insulated



Solid

Stranded Green THHN/THWN-2

Part No.	Electro Tin Plated Part No.	Size (AWG)	No. of Strands	PVC Insulation Thickness (mils)	Nylon Jacket Thickness (mils)	Approx. O.D. Inches	Ampacity 90° C Wet/Dry*	Approx. Wt. lbs./M ft.
2-19GTHHN	2-19TGTHHN	2	19	40	7	0.380	130	236
1-19GTHHN	1-19TGTHHN	1	19	50	8	0.437	145	303
1/0-19GTHHN	1/0-19TGTHHN	1/0	19	50	8	0.476	170	378
2/0-19GTHHN	2/0-19TGTHHN	2/0	19	50	8	0.520	195	473
3/0-19GTHHN	3/0-19TGTHHN	3/0	19	50	8	0.570	225	589
4/0-19GTHHN	4/0-19TGTHHN	4/0	19	50	8	0.626	260	735

Solid Green THHN/THWN-2

Part No.	Electro Tin Plated Part No.	Size (AWG)	No. of Strands	PVC Insulation Thickness (mils)	Nylon Jacket Thickness (mils)	Approx. O.D. Inches	Ampacity 90° C Wet/Dry*	Approx. Wt. lbs./M ft.
6SGTHHN	6STGTHHN	6	1	30	6	0.234	75	92
4SGTHHN	4STGTHHN	4	1	40	7	0.298	95	147
2SGTHHN	2STGTHHN	2	1	40	7	0.352	130	226

Stranded Green THW-2

Part No.	Electro Tin Plated Part No.	Size (AWG)	No. of Strands	PVC Insulation Thickness (mils)	Approx. O.D. Inches	Ampacity 90° C Wet/Dry*	Approx. Wt. lbs./M ft.
6-7GTHW2	6-7TGTHW2	6	7	60	0.304	75	111
4-7GTHW2	4-7TGTHW2	4	7	60	0.352	95	166
3-7GTHW2	3-7TGTHW2	3	7	60	0.380	115	203
2-7GTHW2	2-7TGTHW2	2	7	60	0.412	130	252
1-19GTHW2	1-19TGTHW2	1	19	80	0.481	145	326
1/0-19GTHW2	1/0-19TGTHW2	1/0	19	80	0.520	170	398
2/0-19GTHW2	2/0-19TGTHW2	2/0	19	80	0.564	195	492
3/0-19GTHW2	3/0-19TGTHW2	3/0	19	80	0.614	225	609
4/0-19GTHW2	4/0-19TGTHW2	4/0	19	80	0.670	260	757

Solid Green THW-2

Part No.	Electro Tin Plated Part No.	Size (AWG)	No. of Strands	PVC Insulation Thickness (mils)	Approx. O.D. Inches	Ampacity 90° C Wet/Dry*	Approx. Wt. lbs./M ft.
6SGTHW2	6STGTHW2	6	1	60	0.282	75	103
4SGTHW2	4STGTHW2	4	1	60	0.324	95	155
2SGTHW2	2STGTHW2	2	1	60	0.378	130	235

NOTES:

- Listed to UL 83 through Intertek.
- Oil Resistance I & II and Flame Rated FT1.
- 600V Voltage Rating for THHN/THWN-2 and THW-2 insulated conductors.
- Contact factory for special requests and for reel sizes/put ups.

* 90°C Wet/Dry Per NEC 2023 for not more than three current-carrying conductors in raceway.

Solid Copper Conductors

Solid Soft-Drawn Bare Copper



Part No.	Electro Tin Plated Part No.	Size (AWG)	Diameter (Inches)	CM Area	Approx. Wt. lbs./M ft.
10	10T	10	0.101	10,380	32
8	8T	8	0.128	16,510	50
6	6T	6	0.162	26,240	80
4	4T	4	0.204	41,470	126
3	3T	3	0.229	52,630	159
2	2T	2	0.257	66,360	201

- 2T can be ordered as stock items 2T-250 (250' standard reel) and 2T-500 (500' standard reel).

NOTES:
- Solid soft-drawn conductors meet the requirements of ASTM B-3.
- Tinned Solid Copper conductors meet the requirements of ASTM B-33.

Solid Copper-Bonded Steel Conductors

#6 Solid Copper-Bonded Steel Dead Soft Annealed

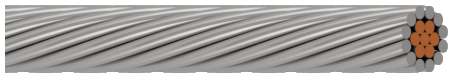


Part No.	Conductivity	Size (AWG)	Diameter (Inches)	CM Area	Approx. Wt. lbs./M ft.
6CW3D	30%	6	0.162	26,240	80
6CW4D	40%	6	0.162	26,240	80

Theft Deterrent Wire



TDW8F-7



TDW4F-19

Part No.	Stranding	No. of Strands	Fusing Current @ 32 ms, (kA)*	Resistance (Ω/kFT)	Diameter (Inches)	Approx. Wt. (lbs./kFT)
TDW8F-7	(1) Tinned Copper, (6) Tin Plated Copper-Clad Steel	7	14.18	0.9343	0.195	81
TDW4F-19	(7) Tinned Copper, (12) Tin Plated Copper-Bonded Steel	19	40.68	0.2821	0.324	226

- Difficult to cut with hand tools.
- Designed for high theft areas.
- For use with other Harger theft deterrent and tamper proof products such as Pipe Clamps and Fence Grounding Clamps (See pages 140).

* Onderdonk method

Copper Flat Strap Conductors



Part No.	Width (Inches)	Thickness (Inches)	Actual Gauge	X-Sectional Area (in.2)	Approx. Wt. lbs./M ft.
CUFS1032	1	0.032	20	0.0320	124
CUFS2016	2	0.016	26	0.0318	124
CUFS3016	3	0.016	26	0.0478	186
CUFS4016	4	0.016	26	0.0640	248
CUFS6016	6	0.016	26	0.0956	372

NOTES:
- Add prefix "T" to part number for tinned.
- Additional sizes of conductors available. Contact factory for more sizes and for reel sizes/put ups.

Tinned Copper Flat Braid Conductors



Part No.	Width (Inches)	Thickness (Inches)	Actual Gauge	Nominal Circ. Mils	Amperage	Approx. Wt. lbs./M ft.
CUFB14030	0.25	0.030	14	4,200	32	16
CUFB12094	0.50	0.094	6	24,120	90	84
CUFB58062	0.625	0.062	5	36,000	120	121
CUFB34062	0.75	0.062	6	24,120	93	85
CUFB1062	1	0.062	4	38,592	120	135
CUFB15125	1.5	0.125	2/0	120,600	250	420

NOTES:
- Width and thickness on flat braid items are nominal.
- Additional sizes of conductors available. Contact factory for more sizes and for reel sizes/put ups.

Ground Electrodes & Accessories

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Copper-Bonded Steel Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark	With UPC Label
1208UPC	1/2" x 8'	5.5	5	28	Yes	Yes
1210	1/2" x 10'	7.5	5	38	Yes	No
588	5/8" x 8'	6.8	5	35	Yes	No
588RUS	5/8" x 8'	6.8	5	35	Yes	No
588UPC	5/8" x 8'	6.8	5	35	Yes	Yes
5810	5/8" x 10'	8.5	5	43	Yes	No
5810UPC	5/8" x 10'	8.5	5	43	Yes	Yes
348	3/4" x 8'	10	5	50	Yes	No
3410	3/4" x 10'	12.5	5	63	Yes	No
3412	3/4" x 12'	15	5	75	Yes	No
110	1" x 10'	22	3	66	Yes	No



- For more information refer to Ground Rod table on page 312.

c UL us Listed 467

TECHNICAL NOTES:

- **NEC 2023 Article 250.53(G) (Summarized)**
  The electrode shall be installed so that 8' of length is in contact with the soil. It shall be driven to a depth of not less than 8' except where rock bottom is encountered. In the case of bedrock, the electrode shall be driven at an angle not to exceed 45 degrees from the vertical or shall be buried in a trench that is at least 2-1/2' deep.
- **UL 467 (Summarized)**
  A solid rod electrode of copper or other suitable non-ferrous metal, or a solid rod electrode of iron or steel with a copper or other suitable non-ferrous metal or stainless steel jacket, shall have a diameter not less than 1/2" thick.
- **UL 467 (Summarized)**
  The copper jacket shall not be less than .010" thick at any point.
- **RUS** (Rural Utilities Service) ground rods typically have a 13 mil copper plating thickness.

Solid Copper Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark
588C	5/8" x 8'	10	5	50	Yes
5810C	5/8" x 10'	12	5	60	Yes
348C	3/4" x 8'	13.7	5	69	Yes
3410C	3/4" x 10'	17	5	85	Yes
110C	1" x 10'	31	3	93	Yes



- All rods are full diameter.
- Manufactured from alloy 110 electrolytic tough pitch hard temper copper bar. Meets ASTM B 133 & ASTM B 187.
- For more information refer to Ground Rod table on page 312.

c UL us Listed 467

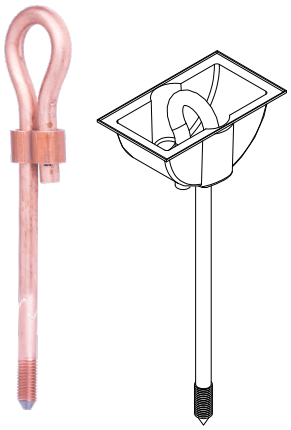
APPLICATION NOTES:

- Solid copper ground electrodes are used when better conductivity and corrosion resistance is preferred.

Tie Down Ground Rods

Part No.	Rod Size	Thread Size	Approx. Each Wt. (lbs.)
348TD	3/4" x 8'	3/4-10 (1.5" long)	11
3410TD	3/4" x 10'	3/4-10 (1.5" long)	13.5
586TD	5/8" x 6'	5/8-11 (1.5" long)	6
588TD	5/8" x 8'	5/8-11 (1.5" long)	8.7

- Copper-Bonded Aircraft Tie Down Ground Rods are manufactured from high strength cold drawn steel with 0.010" thick copper plating.
- Threads are cold-rolled to provide additional strength.
- Use plastic mold TDGRDM (sold separately) during installation.



Tie Down Ground Rod Head

Part No.	Length	Approx. Each Wt. (lbs.)
34TDTOP	12"	2.3

- Used for adding a 3/4" tie down to ground rods, providing a static discharge point for aircrafts, fuel delivery vehicles, etc. in ridged pavement.
- Can be attached to 3/4" sectional ground rods mechanically or exothermically.
- Attached after the standard ground rod has been driven.
- Used when installing static grounding point into compacted subgrade soils.
- Not intended as aircraft tie downs.



Tie Down Plastic Mold

Part No.	Approx. Each Wt. (lbs.)
TDGRDM	0.3

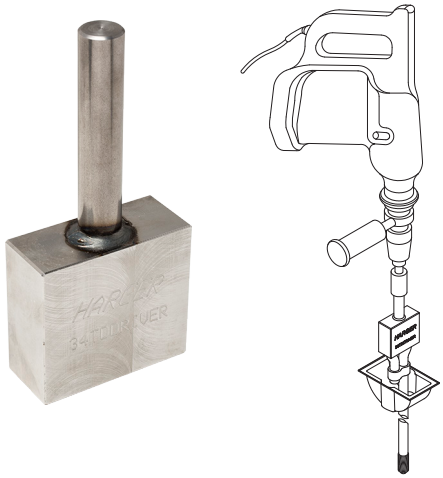
- Used when installing tie down ground rods.



Tie Down Ground Rod Driver

Part No.	Description	Approx. Each Wt. (lbs.)
34TDDRIVER	3/4" Ground Rod Driver	7.8

- For driving 3/4" tie down ground rods, without deforming the eye loop.
- Manufactured from tool hardened shock resistant steel.
- Driving hammer and 3/4" ground rod drive bit not included.



Stainless Steel Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark
1210SS3	1/2" x 10'	7	5	35	Yes
588SS3	5/8" x 8'	9	5	45	Yes
5810SS3	5/8" x 10'	10.5	5	53	Yes
3410SS3	3/4" x 10'	15	5	75	Yes

- All rods are full diameter.
- Manufactured from Solid 304 Stainless Steel.
- For more information refer to Ground Rod table on page 312.



c UL us Listed 467

TECHNICAL NOTES:

- **UL 467 (Summarized)**
  A solid rod electrode of copper or other suitable non-ferrous metal, or a solid rod electrode of iron or steel with a copper or other suitable non-ferrous metal or stainless steel jacket, shall have a diameter not less than 1/2" thick.
- **UL 467 (Summarized)**
  The stainless steel jacket mentioned in 9.2.3 shall not be less than .015 inches thick at any point.
- **UL 467 (Summarized)**
  The stainless steel jacket mentioned above on a stainless steel rod, shall be formed of an austenitic stainless steel of the 18% chromium, 8% nickel type.
- Stainless steel ground rods are used in corrosive soil conditions.

Galvanized Steel Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	With UPC Label
588G	5/8" x 8'	8.5	5	43	No
588GUPC	5/8" x 8'	8.5	5	43	Yes
5810G	5/8" x 10'	10.5	5	55	No
5810GUPC	5/8" x 10'	10.5	5	55	Yes
3410G	3/4" x 10'	15	5	75	No
126G	1/2" x 6'	4	5	20	No
126GUPC	1/2" x 6'	4	5	20	Yes
128G	1/2" x 8'	5.5	5	28	No
128GUPC	1/2" x 8'	5.5	5	28	Yes

- All rods are full diameter.
- For more information refer to Ground Rod table on page 312.



NOTES:

- Manufactured from zinc coated high strength steel.
- Meets requirements of NEMA GR-1.
- Used when primary concern is cathodic protection to structure.
- Non UL listed.

Sectional Ground Rods

Sectional Copper-Bonded Steel Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark
S582	5/8" x 2'	2.5	5	13	No
S583	5/8" x 3'	3.5	5	18	No
S585	5/8" x 5'	5	5	25	No
S588	5/8" x 8'	7	5	35	Yes
S5810	5/8" x 10'	9	5	45	Yes
S348	3/4" x 8'	10	5	50	Yes
S3410	3/4" x 10'	13	5	65	Yes
S110	1" x 10'	22	3	66	No



c UL us Listed 467

• For more information refer to Ground Rod table on page 312.

Sectional Solid Copper Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark
S582C	5/8" x 2'	3	5	15	No
S583C	5/8" x 3'	4	5	20	No
S585C	5/8" x 5'	6	5	30	No
S345C	3/4" x 5'	9	5	45	No
S15C	1" x 5'	16	3	48	No



• All rods are full diameter.

Sectional Stainless Steel Ground Rods

Part No.	Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle	UL Mark
S585SS3	5/8" x 5'	5.5	5	28	No
S588SS3	5/8" x 8'	9	5	45	Yes
S5810SS3	5/8" x 10'	11	5	55	Yes
S3410SS3	3/4" x 10'	15	5	75	Yes



c UL us Listed 467

• All rods are full diameter.
• Manufactured from Solid 304 Stainless Steel. Additional alloys available.

APPLICATION NOTES:

- Sectional ground rods are used to help reduce ground resistance in poor soils such as sand and gravel.
- Doubling ground rod length theoretically reduces resistance 40%.

Ground Rod Couplers

Bronze Threaded Ground Rod Couplers

Part No.	Ground Rod Size	Approx. Each Wt. (lbs.)
GRC12	1/2"	0.3
GRC58	5/8"	0.3
GRC34	3/4"	0.4
GRC1	1"	0.5

- Corrosion resistant silicon bronze threaded ground rod coupler for sectional ground rods.



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Stainless Steel Threaded Ground Rod Couplers

Part No.	Ground Rod Size	Approx. Each Wt. (lbs.)
GRC12SS	1/2"	0.3
GRC58SS	5/8"	0.3
GRC34SS	3/4"	0.5
GRC1SS	1"	0.9

- Corrosion resistant 304 Stainless Steel threaded ground rod coupler for sectional ground rods.



Compression Ground Rod Couplers

Part No.	Ground Rod Size	Approx. Each Wt. (lbs.)
GRCC58	5/8"	0.5
GRCC34	3/4"	0.5

- Corrosion resistant bronze ground rod compression coupler for use on non-sectional copper-bonded ground rods.



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Ground Rod Drivers

Part No.	Description	Ground Rod Size	Approx. Each Wt. (lbs.)
GRD58	Driver & 5/8" Insert	1/2" & 5/8"	25
GRD34I	Replacement Insert	3/4"	12

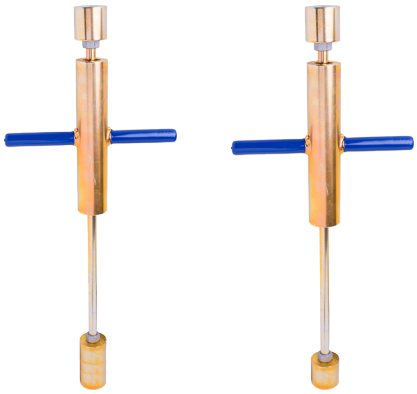
- Drives ground rods from ground level without the need for a ladder or sledge hammer.
- 3/4" insert is interchangeable with driver body.
- Insert minimizes driver from slipping off ground rod near ground level.
- Insert minimizes "mushrooming" the top of ground rod.



Ground Rod Drivers with Slide Hammer

Part No.	Description	Approx. Each Wt. (lbs.)
SMGRD58U	5/8" Ground Rod Driver	16
SMGRD58USHGR	5/8" Ground Rod Driver	14

- SMGRD58U - Ground rod driver with slide hammer. One end is threaded for use with threaded 5/8" ground rods and the other end is for use with tapered 5/8" copper-bonded steel ground rods.
- SMGRD58USHGR - Ground rod driver with slide hammer, connects to ground rods with 5/8" threads on both ends.
- Used to install or remove threaded ground rods.



SMGRD58U SMGRD58USHGR

Drive Sleeves

Part No.	Ground Rod Size	Approx. Each Wt. (lbs.)
GRDS58	5/8"	1.5
GRDS34	3/4"	1.3

- For copper-bonded steel ground rods.
- Prevents "mushrooming" the top of ground rod while driving rod.



Drive Studs

Part No.	Ground Rod Size	Approx. Each Wt. (lbs.)
GDS12	1/2"	0.2
GDS58	5/8"	0.2
GDS34	3/4"	0.5
GDS1	1"	0.8

- High strength alloy driving stud prevents damage to the coupler or ground rod threads when driving ground rods.

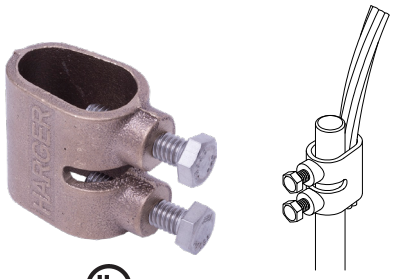


Ground Rod Clamps

Universal Ground Rod Clamp - Heavy Duty

Part No.	Ground Rod Size	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
302U	1/2"	#6 Sol. - 350 MCM	0.4
	5/8"	#6 Sol. - 350 MCM	
	3/4"	#2 Sol. - 250 MCM	

- Heavy duty bronze ground rod clamp.
- Provides over 1-1/2 inches of contact area with cables and ground rod.
- Two stainless steel cap screws secure the cable to the ground electrode for a positive electrical connection.

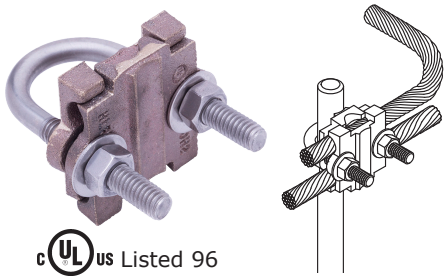


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"U" Bolt Ground Rod Clamp

Part No.	Ground Rod Size	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
305	1/2" thru 1"	#6 - 500 MCM	0.4

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



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Ground Rod Clamp - Light Duty

Part No.	Ground Rod Size	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
300LD	1/2"	10 Sol. - #2 Str.	0.1
301LD	5/8"	10 Sol. - #2 Str.	0.1
302LD	3/4"	10 Sol. - #2 Str.	0.2
303LD	1"	8 Sol. - 4/0	0.3

- Bronze cap screw secures the cable to the ground electrode.
- Commonly called acorn or tear drop clamp.

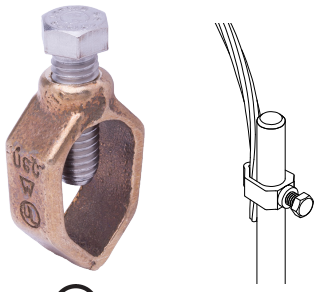


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Universal Ground Rod Clamp - Light Duty

Part No.	Ground Rod Size	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
302UGRC	1/2"	10 Sol. - 1/0	0.2
	5/8"	10 Sol. - 1/0	
	3/4"	8 Sol. - 1/0	

- Reduces the need to inventory assorted clamps of differing sizes.
- Manufactured from corrosion resistant silicon bronze.
- UL and CSA listed for Direct Burial.



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APPLICATION NOTES:

- Ground Rod Clamps for lightning protection systems require 1-1/2" of surface contact between conductor and ground rod.
- Light duty series (300LD, 301LD, 302LD & 302UGRC) acceptable for electrical grounding, but not lightning protection.

Ground Rod Clamps

HammerHeads - One Conductor

Part No.	Copper-Bonded Ground Rod Diameter		Conductor Range (AWG)	Approx. Each Wt. (lbs.)	UL Mark
	Nominal	Actual			
HHGRC12F4S6S	1/2"	0.50"	#6 Solid - #4 Solid	0.3	No
HHGRC12F24	1/2"	0.50"	#4 Stranded - #2 Stranded	0.3	No
HHGRC12F2/01/0	1/2"	0.50"	1/0 Stranded - 2/0 Stranded	0.3	No
HHGRC584S6S	5/8"	0.56"	#6 Solid - #4 Solid	0.3	Yes
HHGRC5824	5/8"	0.56"	#4 Stranded - #2 Stranded	0.3	Yes
HHGRC582/01/0	5/8"	0.56"	1/0 Stranded - 2/0 Stranded	0.3	No
HHGRC344S6S	3/4"	0.68"	#6 Solid - #4 Solid	0.3	No
HHGRC3424	3/4"	0.68"	#4 Stranded - #2 Stranded	0.3	No
HHGRC342/01/0	3/4"	0.68"	1/0 Stranded - 2/0 Stranded	0.3	No



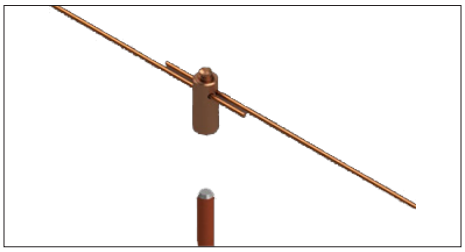
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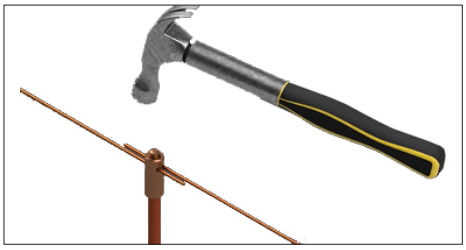
HammerHeads - Two Conductors

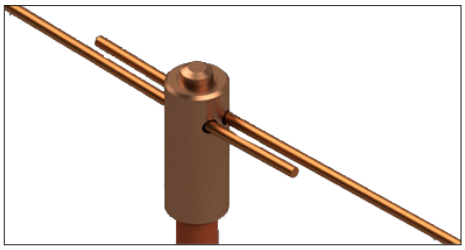
Part No.	Copper-Bonded Ground Rod Diameter		Conductor Range (AWG)	Approx. Each Wt. (lbs.)	UL Mark
	Nominal	Actual			
HHGRC12F4S6S-2	1/2"	0.50"	#6 Solid - #4 Solid	0.3	No
HHGRC584S6S-2	5/8"	0.56"	#6 Solid - #4 Solid	0.3	Yes
HHGRC5824-2	5/8"	0.56"	#4 Stranded - #2 Stranded	0.3	Yes
HHGRC5822S-2	5/8"	0.56"	#2 Solid - #2 Stranded	0.3	No



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APPLICATION NOTES:

- HammerHeads provide a low resistance, permanent, and irreversible connection with quick and simple installation.
- HammerHeads are acceptable for electrical grounding, but not lightning protection.

Ground Receptacles

Part No.	Ground Rod Size	Connection Method	Approx. Each Wt. (lbs.)
3504SS	1/2"	Set Screw	1.8
3505SS	5/8"	Set Screw	1.8
3506SS	3/4"	Set Screw	1.8
3504T	1/2"	Threaded	1.8
3505T	5/8"	Threaded	1.8
3506T	3/4"	Threaded	1.8



- 350 Series heavy duty bronze floor receptacle features a flush mount cover attached to the main body via a stainless steel ball chain.
- Receptacle top is 3" in diameter, height is 3-1/2".

Part No.	Ground Rod Size	Connection Method	Approx. Each Wt. (lbs.)
3514SS	1/2"	Set Screw	2
3515SS	5/8"	Set Screw	2
3516SS	3/4"	Set Screw	2
3514T	1/2"	Threaded	2
3515T	5/8"	Threaded	2
3516T	3/4"	Threaded	2



- Similar to 350 Series except features a bronze dual cable connector.
- 351 Series accept ground loop conductors; important when establishing an equipotential ground plane.
- Accepts all conductors up to 4/0.
- Receptacle top is 3" in diameter, height is 3-1/2".

Part No.	Approx. Each Wt. (lbs.)
SGRX	1.5



- Ground receptacle designed to be exothermically connected to the ground electrode system. See page 298 for mold styles.

Brass Ball Studs

Part No.	Thread Size	Approx. Each Wt. (lbs.)
BBSTUD14	1/4"	0.5
BBSTUD38	3/8"	0.5
BBSTUD12	1/2"	0.5



- Used as replacement studs for ground receptacles.
- Can also be mounted on ground bars.
- Brass Ball Stud: 3/4" in diameter, 1-1/2" total length.

APPLICATION NOTES:

- Ground Receptacles are used when temporary grounds must be established.
- Used for grounding aircrafts during refueling.
- BBSTUD12 replaceable brass ball stud located inside the receptacle provides the termination point for grounding clamps.

Mobile Ground Stake Kits

Part No.	Rod Section Sizes	Overall Depth	Approx. Each Wt. (lbs.)
MOBGRDSTK582	5/8" x 2'	6'	14
MOBGRDSTK583	5/8" x 3'	9'	20



Kit Includes:
(3) Copper-bonded sectional ground rods
(3) 5/8" ground rod couplers
(1) 5/8" drive stud
(1) U-Bolt ground rod clamp
(1) 5/8" eyelet
- Bottom rod has tapered end to facilitate driving.

Part No.	National Stock Number (NSN)	Rod Section Sizes	Overall Depth	Approx. Each Wt. (lbs.)
582GTEKIT	5975-01-497-0438	5/8" x 2'	6'	14
583GTEKIT	5975-01-497-1496	5/8" x 3'	9'	20



Kit Includes:
(3) Copper-bonded sectional ground rods
(3) 5/8" ground rod couplers
(1) 5/8" drive stud
(1) U-Bolt ground rod clamp
- Bottom rod has tapered end to facilitate driving.

APPLICATION NOTES:

- Mobile ground stakes provide temporary grounds for military communications vehicles, tanks, COWs (Cell-site On Wheels), etc. Usually a ground loop is installed around the vehicle to help provide an equipotential ground plane. Eyelet provides for easy means of removal.

Copper Ground Plates

Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
335	18" x 18"	0.032	4.7
336	24" x 24"	0.032	8

- Features two dual cable connectors.



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Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
334-1	12" x 12"	0.032	2.7
335-1	18" x 18"	0.032	5
336-1	24" x 24"	0.032	8

- Features a single dual cable connector.



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Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP18182T	18" x 18"	2T	4
GP18184/0	18" x 18"	4/0	4.5
GP24242T	24" x 24"	2T	6.5
GP24244/0	24" x 24"	4/0	7

- Features an 18" or 24" (depending on the size of the plate) copper conductor exothermically welded to the plate.
- Thickness is 0.032 inches.



Additional sizes and thicknesses available. Contact factory for more information.

TECHNICAL NOTES:

- **NEC 2023 Article 250.52(A)(7) (Summarized)**
  Each plate electrode shall expose not less than 0.186 m^2 (2 ft^2) of surface to exterior soil. Electrodes of non-ferrous metal shall be at least 1.5 mm (0.06 in.) in thickness.
- **NEC 2023 Article 250.53(A)**
  Rod, Pipe, and Plate Electrodes. Where practicable, rod, pipe and plate electrodes shall be embedded below permanent moisture level. Rod, pipe and plate electrodes shall be free from nonconductive coatings such as paint or enamel.

Pole Bottom Ground Plate

Part No.	Connection Type	Conductor Size	Diameter	Thickness	Approx. Each Wt. (lbs.)
PBP7	Lug	#14 Solid - #4 Stranded	7.5"	0.025"	0.5

- Efficient installation.
- Made of electrolytic 110 copper.
- Integrated ground conductor connector.
- Moisture trapping grooves.



APPLICATION NOTES:

- Copper Ground Plates are used in areas having little or no top soil.
- Can also be used to enhance ground grid systems.
- Can be used in conjunction with earth enhancement material such as Ultrafill.

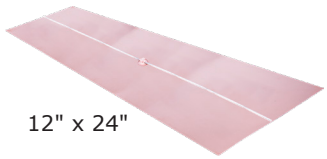
NEC Compliant Copper Ground Plates

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP06212122T	12" x 12"	2T	3.3
GP06212124/0	12" x 12"	4/0	3.7
GP06212242T	12" x 24"	2T	6.5
GP06212244/0	12" x 24"	4/0	7

- Features a 12" or 24" (depending on the size of the plate) copper conductor exothermically welded to the plate.
- Thickness is 0.062 inches.



12" x 12"



12" x 24"

Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
GP141818N	18" x 18"	0.25	27
GP142424N	24" x 24"	0.25	47

- 1/4" thick bare copper ground plate.
- Field connection required.



Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP142424JDP	24" x 24"	4/0	52.5

- 1/4" x 24" x 24" ground plate with zig-zag sheared edges significantly provides more edge surface area than conventional ground plates.
- 5' long 4/0-7 strand tail exothermically welded to center of plate.
- FAA-STD-019f Compliant.



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Additional sizes and thicknesses available.
Contact factory for more information.

TECHNICAL NOTES:

- **NEC 2023 Article 250.52(A)(7) (Summarized)**
  Each plate electrode shall expose not less than 0.186 m^2 (2 ft^2) of surface to exterior soil. Electrodes of non-ferrous metal shall be at least 1.5 mm (0.06 in.) in thickness.
- **NEC 2023 Article 250.53(A)**
  Rod, Pipe, and Plate Electrodes. Where practicable, rod, pipe and plate electrodes shall be embedded below permanent moisture level. Rod, pipe and plate electrodes shall be free from nonconductive coatings such as paint or enamel.

APPLICATION NOTES:

- Copper Ground Plates are used in areas having little or no top soil.
- Can also be used to enhance ground grid systems.
- Can be used in conjunction with earth enhancement material such as Ultrafill.

Ultrafill - Earth (Ground) Enhancement Material

Ultrafill is a low resistance carbon based backfill material, which dramatically lowers ground system resistance in difficult soil situations. Ultrafill contains no bentonite or concrete components, which, in very dry conditions, can cause shrinkage around the ground electrode, thus rendering it ineffective.

Ultrafill is ideal for use in rocky soil, sand, gravel or any other high resistance soil conditions. It is also the ideal backfill material for use around enhanced ground rods and ground grid systems.

Ultrafill is easy to use, safe and effective. Unlike other backfill products, Ultrafill is relatively dust free and does not require mixing in water prior to installation.

Ultrafill may be either used in a horizontal trench or grid, or in vertical applications. Ultrafill is available in 25 and 50 pound coated woven polypropylene bags and 25 pound buckets.

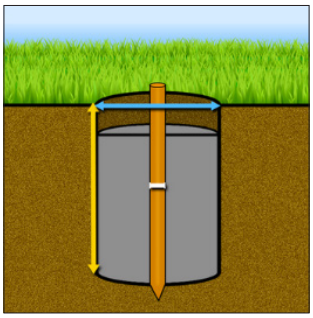
Part No.	Approx. Wt.
ULTRAFILL	50 lbs.
ULTRAFILL25	25 lbs.
ULTRAFILLBK	25 lbs.

- Contains less than 1% sulfer.
- Meets FAA-STD-019f requirements.



Ultrafill Calculator App

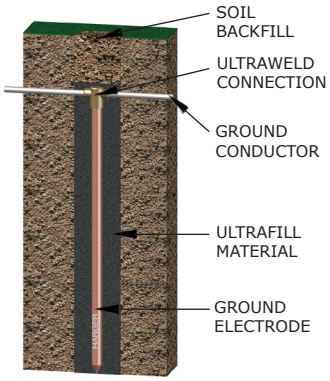
Harger's Ultrafill Calculator App provides the quantity of Ultrafill material recommended based on your project's specifications and packaging preference.



Installation Instructions

Vertical Applications:

Auger hole to required depth. Insert electrode in center of hole. Pour Ultrafill to proper depth. The chart located to the right will help determine how much Ultrafill will be required.

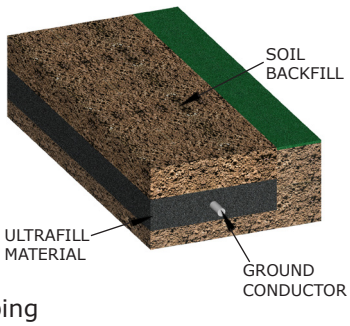


Pounds of Ultrafill Recommended Per Foot		
Hole Size	5/8" Ground Rod	2" EGR
4"	3.5	2.7
6"	8.1	7.3
8"	14.5	13.6
10"	22.6	21.8
12"	32.6	31.8

For example, placing a 5/8" x 10' ground rod in a 4" hole would require 35 pounds of Ultrafill. (3.5 x 10 = 35 pounds)

Horizontal Applications:

Pour enough Ultrafill to cover bottom of trench. Place the ground electrode into trench. Pour in additional Ultrafill to cover electrode to the desired depth.



Pounds of Ultrafill Recommended Per Foot				
Trench Width	Thickness of Ultrafill (Inches)			
	1"	2"	3"	4"
4"	1.2	2.3	3.5	4.6
6"	1.7	3.5	5.2	6.9
8"	2.3	4.6	6.9	9.3
10"	2.5	5.8	8.7	11.6
12"	3.5	6.9	10.4	13.9

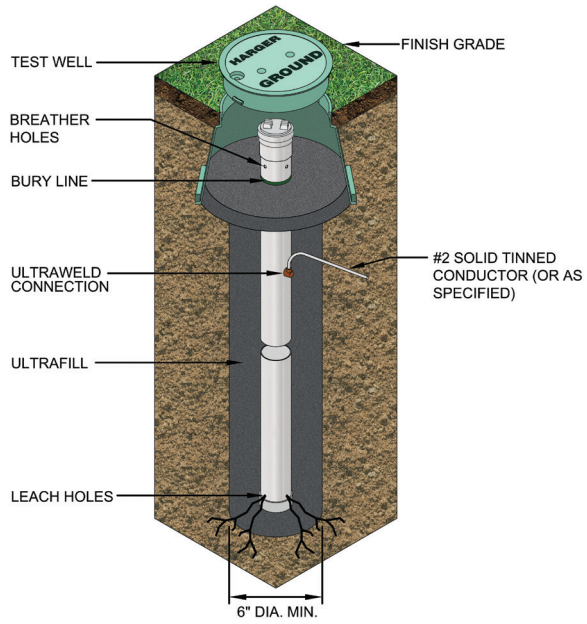
For example, using 2" of material in a 6" wide by 10' long trench would require 35 pounds of Ultrafill. (3.5 x 10 = 35 pounds)

Liquid Mixing Instructions:
To mix Ultrafill into a slurry for pumping applications, use the following formula:
6 parts water
1 part bentonite
1 part Ultrafill

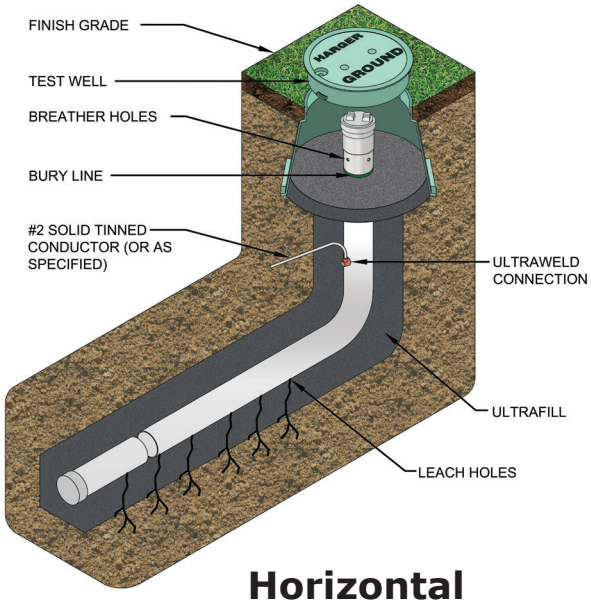
Enhanced Ground Rods

An Enhanced Ground Rod is a conductive hollow tube ground rod, usually manufactured from 300 stainless steel or copper. They contain special hygroscopic, electrolytic salts. These salts form a saline solution by absorbing moisture out of the atmosphere. This saline solution leaches out of the bottom of the rod, which gradually lowers resistivity of the surrounding soil, forming "electrolytic roots" over time.

The salt mixture is critical. Harger utilizes a special combination of Magnesium Sulfate and Calcium Chloride. Calcium Chloride is an "active" salt, which continually draws moisture out of the air and forms the solution. Many other providers of this type of electrode utilize salts such as Sodium Chloride, some even use common water softener pellets. These salts do not draw moisture out of the air, they must be activated by adding water. This may lower resistivity initially, however, unless water is continually added, the salts dry out over time and resistivity of the electrode goes back up. Harger utilizes Magnesium Sulfate, a less corrosive salt (commonly known as Epsom Salts) to replace the much more corrosive product, Sodium Chloride.



Vertical



Horizontal

To increase the efficacy of the Enhanced Ground Rod, a very low resistance ground enhancement material is placed around the rod. Harger proudly uses Ultrafill; an ultra-low resistance carbon based material.

Harger exothermically attaches a conductor of your choice to the enhanced ground rod. This conductor is called the tail. The tail direction is very important. Harger provides a design which allows the current, either lightning or electrical fault, to maintain a downward sloping path to ground. Most manufacturers utilize a design which forces lightning to go "uphill" before reaching the ground rod. Some manufactures claim a superior "x" design. Although at first this sounds good, it causes the contractor to make twice as many connections, thus increasing the cost of installation.

Harger offers two basic styles, vertical and horizontal (L-shaped). We also offer a variety of lengths, sectionals and different kits to meet your specific requirements.

Enhanced Ground Rod Numbering System





c UL us Listed 467





EGR SS 10 L W G 2T

- **EGR** — **Enhanced Ground Rod**
- **SS** — **Material**: Copper - Blank; Stainless Steel - Add "SS"
- **10** — **Length** (ft.)
- **L** — **Style**: Vertical - Blank; Horizontal - Add "L"
- **W** — **Inspection Well**: Include in Kit - Add "W"; None Required - Blank
- **G** — **Ultrafill Ground Material**: Include in Kit - Add "G"; None Required - Blank
- **2T** — **Conductor Type**

The Enhanced Ground Rod Numbering System allows you to customize the product to meet your specific needs. In the above example, the product specified is a stainless steel, 10' long, L-Shaped ground rod that includes an inspection well and two 50 pound bags of Ultrafill with a #2 solid tinned 5' tail exothermically welded to the rod. The part number is **EGRSS10LWG2T**.

TECHNICAL NOTES:

- **UL 467 (Summarized)**
  A hollow-tube, chemically-charged-rod electrode shall:
  a) Be constructed of copper or an equivalent material resistant to the corrosive effects of moist soil;
  b) Have an internal diameter not less than 2" and a wall thickness not less than .080"; and
  c) If the means of installation is not obvious, be accompanied by adequate installation instructions.
- **UL 467 (Summarized)**
  The chemical charge within the rod electrode shall be a substance that does not cause the electrode to corrode at a faster rate than an electrode constructed of 3/4" trade size ferrous metal conduit.
- **UL 467 (Summarized)**
  A chemical charge of 60% sodium chloride and 40% calcium chloride may be used if the total weight of the charge is less than 11 pounds.

Copper Sectional Enhanced Ground Rod Kits



c UL us Listed 467





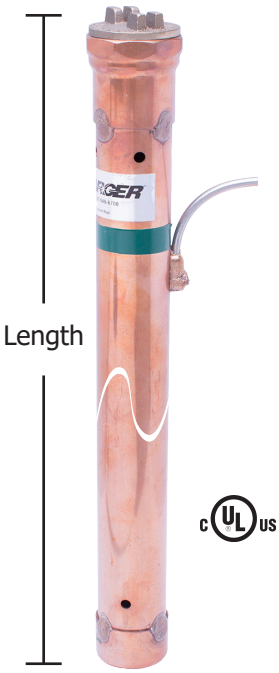
Part No.	Overall Length	Section Length	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
SEGR10WG2T	10'	5'	Yes	2	5' - #2 Solid Tinned	185
SEGR10WG2/0	10'	5'	Yes	2	5' - 2/0 Stranded	190
SEGR10WG4/0	10'	5'	Yes	2	5' - 4/0 Stranded	195
SEGR20WG2T	20'	10'	Yes	4	5' - #2 Solid Tinned	320
SEGR20WG2/0	20'	10'	Yes	4	5' - 2/0 Stranded	325
SEGR20WG4/0	20'	10'	Yes	4	5' - 4/0 Stranded	330
SEGR30WG2T	30'	15'	Yes	6	5' - #2 Solid Tinned	450
SEGR30WG2/0	30'	15'	Yes	6	5' - 2/0 Stranded	455
SEGR30WG4/0	30'	15'	Yes	6	5' - 4/0 Stranded	460
SEGR40WG2T	40'	20'	Yes	8	5' - #2 Solid Tinned	585
SEGR40WG2/0	40'	20'	Yes	8	5' - 2/0 Stranded	590
SEGR40WG4/0	40'	20'	Yes	8	5' - 4/0 Stranded	595

- Premixed Refill Salts (REFILLSALT10V) for 10’ vertical rods. Order multiple bags for longer rods.
- Additional size conductors available. Contact factory for more information.

APPLICATION NOTES:

- Used where there are vertical height restrictions or when lengths greater than 20' are desired.
- Conductor is welded 18" down from the top.
- Outside diameter of copper tube is 2-1/8".
- Follow Installation and Maintenance Instructions for best results.

Copper Vertical Enhanced Ground Rod Kits







c UL us Listed 467

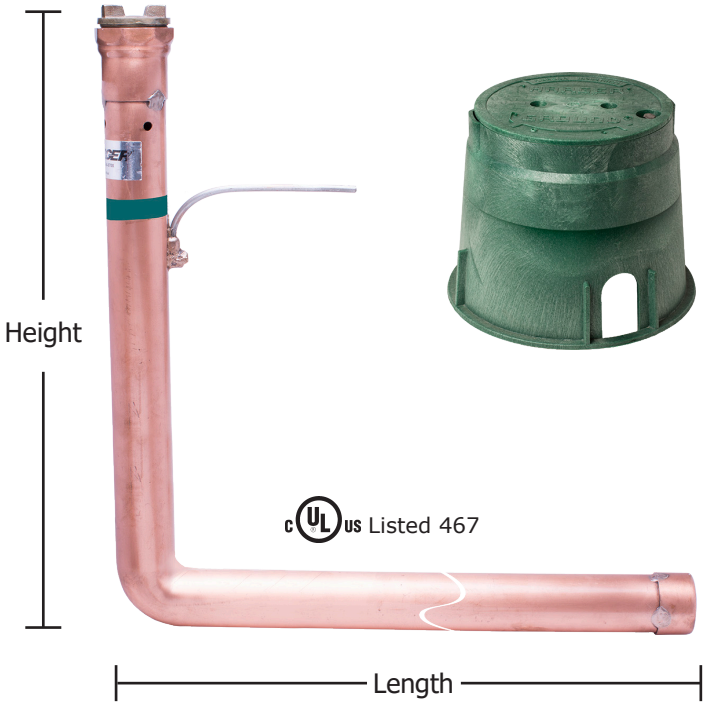
Part No.	Length	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGR8WG2T	8'	Yes	2	5' - #2 Solid Tinned	135
EGR8WG2/0	8'	Yes	2	5' - 2/0 Stranded	134
EGR8WG4/0	8'	Yes	2	5' - 4/0 Stranded	136
EGR10WG2T	10'	Yes	2	5' - #2 Solid Tinned	140
EGR10WG2/0	10'	Yes	2	5' - 2/0 Stranded	142
EGR10WG4/0	10'	Yes	2	5' - 4/0 Stranded	143
EGR20WG2T	20'	Yes	4	5' - #2 Solid Tinned	320
EGR20WG2/0	20'	Yes	4	5' - 2/0 Stranded	330
EGR20WG4/0	20'	Yes	4	5' - 4/0 Stranded	330

- Premixed Refill Salts (REFILLSALT10V) for 10’ vertical rods. Order multiple bags for longer rods.
- Additional sizes and conductor types available. Contact factory for more information.

APPLICATION NOTES:

- Enhanced grounds are used in high resistivity soil conditions and when low resistance ground electrode systems are critical.
- Conductor is welded 18" down from the top.
- Outside diameter of copper tube is 2-1/8".
- Follow Installation and Maintenance Instructions for best results.

Copper Horizontal L-Shaped Enhanced Ground Rod Kits





Part No.	Dims Height* x Length*	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGR8LWG2T	2' x 8'	Yes	2	5' - #2 Solid Tinned	139
EGR8LWG2/0	2' x 8'	Yes	2	5' - 2/0 Stranded	140
EGR8LWG4/0	2' x 8'	Yes	2	5' - 4/0 Stranded	140
EGR10LWG2T	2' x 10'	Yes	2	5' - #2 Solid Tinned	144
EGR10LWG2/0	2' x 10'	Yes	2	5' - 2/0 Stranded	145
EGR10LWG4/0	2' x 10'	Yes	2	5' - 4/0 Stranded	146
EGR20LWG2T	2' x 20'	Yes	4	5' - #2 Solid Tinned	274
EGR20LWG2/0	2' x 20'	Yes	4	5' - 2/0 Stranded	275
EGR20LWG4/0	2' x 20'	Yes	4	5' - 4/0 Stranded	276

- Premixed Refill Salts (REFILLSALT10L) for 10’ horizontal “L” shaped rods. Order multiple bags for longer rods
- Additional sizes and conductor types available. Contact factory for more information.

* Nominal dimensions.

APPLICATION NOTES:

- Enhanced grounds are used in high resistivity soil conditions and when low resistance ground electrode systems are critical.
- L-shaped enhanced ground rods are used when proper depth cannot be achieved due to physical conditions such as bedrock.
- Conductor is welded 11" down from the top.
- Outside diameter of copper tube is 2-1/8".
- Follow Installation and Maintenance Instructions for best results.

Stainless Steel Vertical Enhanced Ground Rod Kits







c UL us Listed 467

Part No.	Length	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS8WG2T	8'	Yes	2	5' - #2 Solid Tinned	143
EGRSS8WG2/0	8'	Yes	2	5' - 2/0 Stranded	144
EGRSS8WG4/0	8'	Yes	2	5' - 4/0 Stranded	145
EGRSS10WG2T	10'	Yes	2	5' - #2 Solid Tinned	150
EGRSS10WG2/0	10'	Yes	2	5' - 2/0 Stranded	151
EGRSS10WG4/0	10'	Yes	2	5' - 4/0 Stranded	153
EGRSS20WG2T	20'	Yes	4	5' - #2 Solid Tinned	292
EGRSS20WG2/0	20'	Yes	4	5' - 2/0 Stranded	293
EGRSS20WG4/0	20'	Yes	4	5' - 4/0 Stranded	294

- Manufactured from corrosion resistant 300 series stainless steel.
- Premixed Refill Salts (REFILLSALT10V) for 10’ vertical rods. Order multiple bags for longer rods.
- Additional sizes and conductor types available. Contact factory for more information.

APPLICATION NOTES:

- Enhanced grounds are used in high resistivity soil conditions and when low resistance ground electrode systems are critical.
- Excellent for corrosive soils or cathodic protection applications.
- Conductor is welded 18" down from the top.
- Outside diameter of stainless steel tube is 2-3/8".
- Follow Installation and Maintenance Instructions for best results.

Stainless Steel Horizontal L-Shaped Enhanced Ground Rod Kits





Part No.	Dims Height* x Length*	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS8LWG2T	2' x 8'	Yes	2	5' - #2 Solid Tinned	147
EGRSS8LWG2/0	2' x 8'	Yes	2	5' - 2/0 Stranded	148
EGRSS8LWG4/0	2' x 8'	Yes	2	5' - 4/0 Stranded	149
EGRSS10LWG2T	2' x 10'	Yes	2	5' - #2 Solid Tinned	154
EGRSS10LWG2/0	2' x 10'	Yes	2	5' - 2/0 Stranded	155
EGRSS10LWG4/0	2' x 10'	Yes	2	5' - 4/0 Stranded	157
EGRSS20LWG2T	2' x 20'	Yes	4	5' - #2 Solid Tinned	254
EGRSS20LWG2/0	2' x 20'	Yes	4	5' - 2/0 Stranded	295
EGRSS20LWG4/0	2' x 20'	Yes	4	5' - 4/0 Stranded	296

- Manufactured from corrosion resistant 300 series stainless steel.
- Premixed Refill Salts (REFILLSALT10L) for 10’ horizontal “L” shaped rods. Order multiple bags for longer rods.
- Additional sizes and conductor types available. Contact factory for more information.

* Nominal Dimensions

APPLICATION NOTES:

- Enhanced grounds are used in high resistivity soil conditions and when low resistance ground electrode systems are critical.
- L-shaped enhanced ground rods are used when proper depth cannot be achieved due to physical conditions such as bedrock.
- Excellent for corrosive soils or cathodic protection applications.
- Conductor is welded 11" down from the top.
- Outside diameter of stainless steel tube is 2-3/8".
- Follow Installation and Maintenance Instructions for best results.

Ground Access Wells


GAW121212HD


GAW121218HD


GAW121224HD*


GAW132418HD

Light Weight Composite

Part No.	Dimensions	Lid Engraving	Approx. Each Wt. (lbs.)
GAW121212HD	12" x 12" x 12" deep	GROUND	28
GAW121218HD	12" x 12" x 18" deep	GROUND	33
GAW121224HD*	12" x 12" x 24" deep	GROUND	43
GAW132418HD	13" x 24" x 18" deep	GROUND	78

- Body is Tier 15 rated, manufactured from light weight composite for exceptional toughness and reduced weight.
- Comes with Tier 15 rated lid manufactured from high density polymer concrete.
- Standard lid is engraved "GROUND".
- Suitable for installation and use through a temperature range of -40°C to +90°C.
- Gray color.

* GAW121224HD is a two-piece stackable, each 12" high.



Standard Lid Engraving



Custom Engraving Available. Contact factory for details.

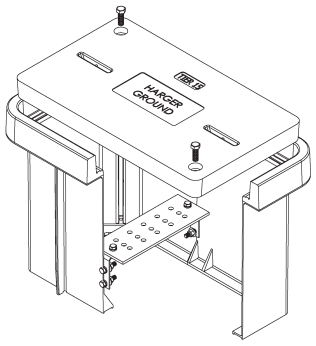
ANSI/SCTE 77 Specifications

Class Vehicle	GVW (lb)	Max Wheel Load (lb)	Design Load	Test Load	Load Category
Truck, up to Class 7	33000	13200	15000#	22500	Tier 15
Tier 15 boxes and covers may be placed in locations that may see occasional non-deliberate heavy vehicles.					
No polymer concrete box or cover should be placed in a full traffic, H-20, application. Meets W.U.C. 3.6.					

Ground Access Wells with Integrated Bus Bar

Part No.	Dimensions	Lid Engraving	Approx. Each Wt. (lbs.)
GAW132418HDGB	16" x 25-1/2" x 18" deep	GROUND	75

- 1/4" x 4" x 11" copper bus bar listed to UL 467.
- Allows for disconnection of ground system for testing.
- Ground Access Well is made of light weight composite material.



Ground Access Wells

High Security Wells

Part No.	Dimensions	Approx. Each Wt. (lbs.)
GAW121212TDLH	12" x 12" x 12" deep	40
GAW181818TDLH	18" x 18" x 18" deep	80
GAW242424TDLH	24" x 24" x 24" deep	140
GAW363636TDLH	36" x 36" x 36" deep	300



- H-20 traffic rating for wheel loading of 32,000 lbs. (14,500 kgs) per axle.
- 3/8" steel top cover with 120 degree opening latch.
- Accepts #3 padlock.
- Must be shipped by LTL Freight Carrier.

Concrete Well with Cast Iron Cover

Part No.	Outside Diameter	Inside Diameter	Length	Approx. Each Wt. (lbs.)
360TD	13-3/4”	10”	24"	100
360TDNE*	13-3/4”	10”	12"	71
362TD	17-1/4”	12”	24"	137
362TDNE*	17-1/4”	12”	12"	102



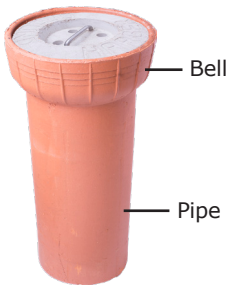
*No Extension

- H-20 traffic rating for wheel loading of 32,000 lbs. (14,500 kgs) per axle.
- Designed for a 16,000 lb. wheel load (32,000 lb. dual spaced wheel load).
- Lid is slip resistant and marked "GROUND".
- Must be shipped by LTL Freight Carrier.

* "NE" suffix indicates a “No Extension” version, shown on the right.

Tile Well with Concrete Cover

Part No.	Diameter	Length	Bell I.D. Minimum	Cover Type	Approx. Each Wt. (lbs.)	Replacement Cover Part No.	Approx. Each Wt. (lbs.)
358TC	8"	24"	10-1/2"	Concrete	70	8CC	16
360TC	10"	24"	12-3/4"	Concrete	97	10CC	24
362TC	12"	24"	15-1/8"	Concrete	151	12CC	29



- For use in non-vehicular traffic areas.
- Available in 8", 10" and 12" diameters.
- Diameter is measured on inside diameter of access well bottom.
- Must be shipped by LTL Freight Carrier.
- Concrete covers are specifically made for these Tile Access Wells.

APPLICATION NOTES:

- Provides ready access to ground electrode for testing and inspection purposes.
- To minimize displacement by frost, the access well must be longer than the frost line is deep.

Ground Access Wells

HDPE Well with Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
GAW910	9"	10-1/4"	HDPE	4.5



- For use in non-vehicular traffic areas.
- Molded High Density Polyethylene well features a 9" diameter "twist lock" cover with locking bolt.
- Static vertical load rating = 350 PSF.
- 2 knock outs (mouse holes) allow for routing conductor to the inside.

PVC Belled Hub Wells with Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)	Replacement Cover Part No.	Approx. Each Wt. (lbs.)
360PBS	10"	24"	Flat Steel	19	10PBS	6
360PBSTP	10"	24"	Tamper Proof	27	10PBS	6
362PBS	12"	24"	Flat Steel	26	12PBS	7
362PBSTP	12"	24"	Tamper Proof	28	12PBS	7
368PBS	18"	24"	Flat Steel	58	18PBS	16
368PBSTP	18"	24"	Tamper Proof	58	18PBS	16



360PBS 360PBSTP

- For use in non-vehicular traffic areas.
- Schedule 40 PVC wells feature a belled hub.
- Flat steel covers are 3/16" thick commercial grade steel with a zinc/ultraseal coating.

PVC Well with Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)	Replacement Cover Part No.	Approx. Each Wt. (lbs.)
358PS	8"	24"	Flat Steel	12	8PS	3
358PP	8"	24"	Plastic	14	8PP	1
360PS	10"	24"	Flat Steel	19	10PS	5
360PP	10"	24"	Plastic	15	10PP	2
362PS	12"	24"	Flat Steel	22	12PP	8



- For use in non-vehicular traffic areas.
- Schedule 40 PVC well.
- Steel covers are 3/16" thick commercial grade steel with a zinc/ultraseal coating.
- Plastic covers are manufactured from High Density Polyethylene.

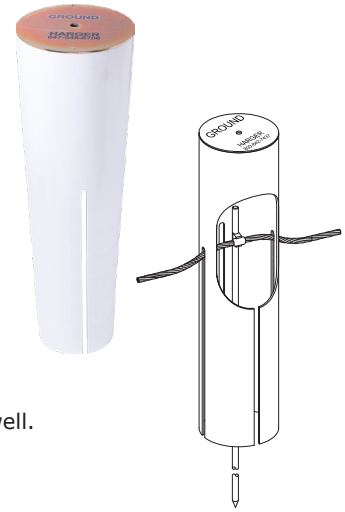
APPLICATION NOTES:

- Provides ready access to ground electrode for testing and inspection purposes.
- To minimize displacement by frost, the access well must be longer than the frost line is deep.

Ground Access Wells

PVC Slotted Well with Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)	Replacement Cover Part No.	Approx. Each Wt. (lbs.)
358P42	8"	42"	Flat Steel	19	8PS	3
358PP42	8"	42"	Plastic	17	8PP	1
360P42	10"	42"	Flat Steel	30	10PS	5
360PP42	10"	42"	Plastic	26	10PP	2



- For use in non-vehicular traffic areas.
- Schedule 40 PVC well.
- Steel covers are 3/16" thick commercial grade steel with a zinc/ultraseal coating.
- Plastic covers are manufactured from High Density Polyethylene.
- Four 27" slots allow for ground electrode connections to be made before installation of test well.

Access Well with 10" Cast Iron Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
360P36CILS80	10"	36"	Cast Iron	61
360P36CILS80TP	10"	36"	Tamper Proof	61
360P42CILS80	10"	42"	Cast Iron	67
360P42CILS80TP	10"	42"	Tamper Proof	67



- For use in non-vehicular traffic areas.
- 10" diameter Schedule 80 PVC well.
- Cast iron cover fits into cast iron ring for extra support.
- Four 27" slots allow for ground electrode connections to be made before installation of test well.

Access Well with 12" Cast Iron Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
362PS12CILS80	12"	12"	Cast Iron	42
362PS24CILS80	12"	24"	Cast Iron	61
362PS30CILS80	12"	30"	Cast Iron	68



- For use in non-vehicular traffic areas.
- 12" diameter Schedule 80 PVC well.
- Cast iron cover fits into cast iron ring for extra support.

APPLICATION NOTES:

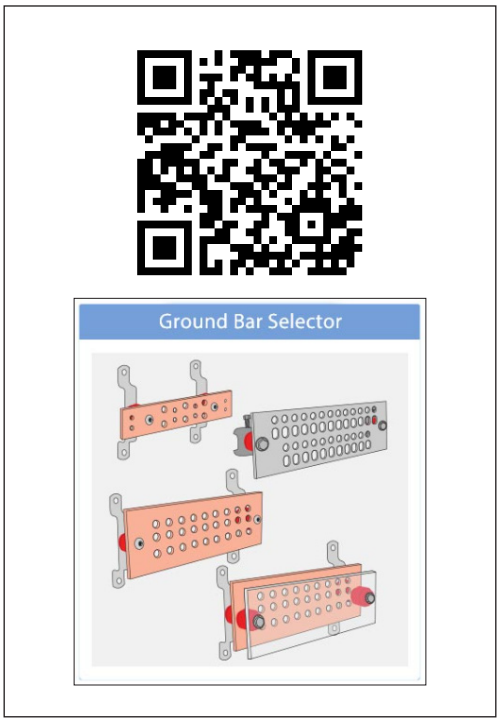
- Provides ready access to ground electrode for testing and inspection purposes.
- To minimize displacement by frost, the access well must be longer than the frost line is deep.

Ground Bars & Accessories

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Ground Bar Selector App



Custom Ground Bar Design

The Ground Bar Selector App has many choices but does not cover all the possible options Harger can provide due to the near-infinite possibilities. Additional options or more detailed dimensions are available for ground bar customizations to fulfill the specific needs of the project or job.

Ground bars come in a variety of material types, not only copper. Aluminum, stainless steel and plating options including tinned copper can be done. Differing thickness, width, and length are available in whichever available material is requested.

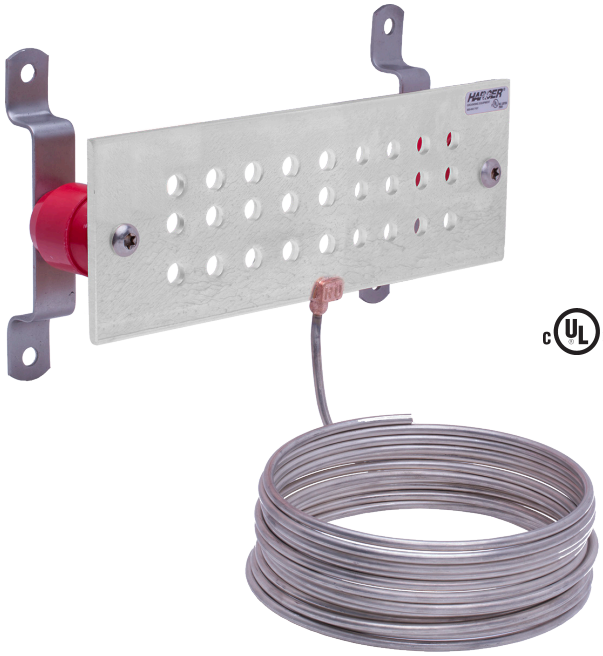
Hole patterns and hole sizes are customizable outside of the standard 7/16” diameter. Harger can manufacture the holes punched or tapped or a mixture of both within the hole pattern chosen!

Specific insulators or mounting brackets can be interchanged from our available parts when the standard ones do not meet requirements.

Exothermically welded tails are conveniently completed at the factory to reduce costs and improve efficiencies in the field. Choose a copper conductor size, type, length, and where you would like it to be located on the bar and Harger takes care of the rest.

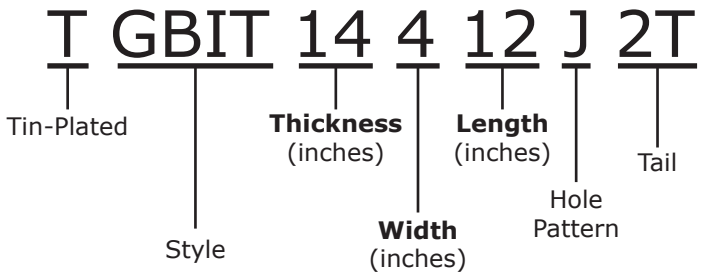
Contact factory for any special requests and customizations.

Harger Ground Bar Numbering System



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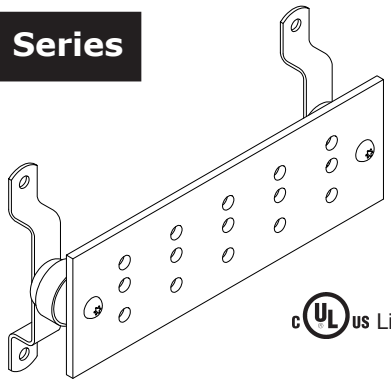
Follow the steps outlined below to specify the style and size of the ground bar you need. The following example is a ground bar with wall mounting brackets, insulators, and an exothermically welded tail. The ground bar is tin plated 1/4" thick, 4" wide and 12" long. It has a hole pattern "J" with a No. 2 AWG solid tinned tail.



1. **Tin-Plated** (optional): Prefix "T" designates electro-tin plated ground bar.
2. **Style:** See Page 48 to specify bar style.
   - GB - Plain ground bar.
   - GBA - Ground bar with stainless steel angle adapters.
   - GBI - Ground bar with wall mounting brackets and insulators.
   - HDGBI - Ground bar with heavy duty wall mounting brackets and insulators.
   - GBIT - Ground bar with wall mounting brackets, insulators and a 25' exothermically welded tail.
   - GBT - Ground bar with tail only.
   - GBS - Ground bar with standoff insulators only.
   - GBB - Ground bar with brackets only.
   - BGB - Bent ground bar.
   - GBIP - Ground bar with insulators, wall mounting brackets and protective clear acrylic cover.
   - GBIA - Ground bar with insulators and stainless steel angle adapters.
   - GBU - Ground bar with insulators, wall mounting brackets and zinc plated malleable beam clamps.
3. **Size:** Thickness, width, and length in inches.
4. **Hole Pattern:** See Page 50 and 51 to specify hole pattern.
5. **Tail** (optional): Specify American Wire Gauge (AWG) size and stranding required. 25' length is standard unless otherwise requested.

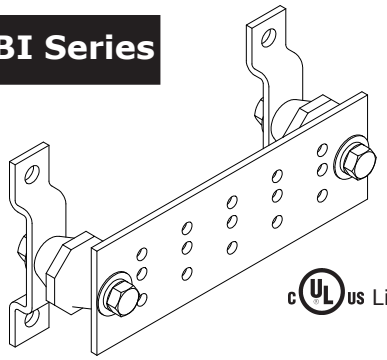
Ground Bar Styles

GBI Series



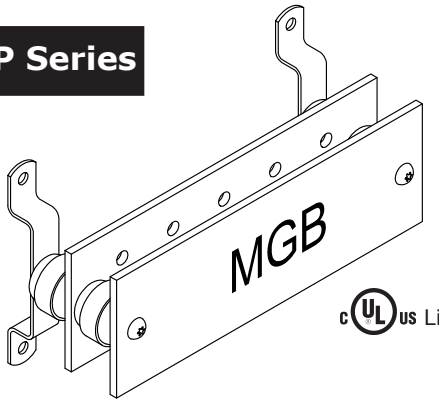
Ground Bar with Wall Mounting **B**rackets and **I**nsulators

HDGBI Series



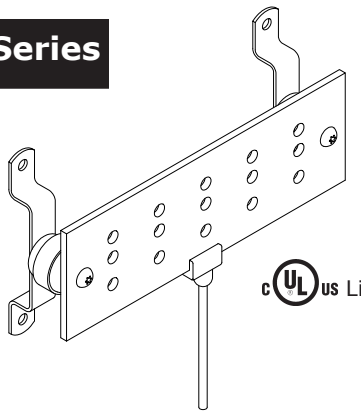
Heavy **D**uty-**G**round Bar with Heavy Duty Wall Mounting **B**rackets and **I**nsulators

GBIP Series



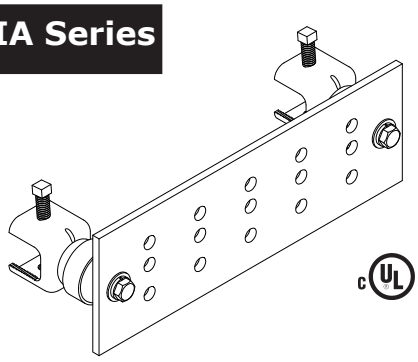
Ground **B**ar with **I**nsulators, Wall Mounting Brackets and **P**rotective Clear Acrylic Cover

GBIT Series



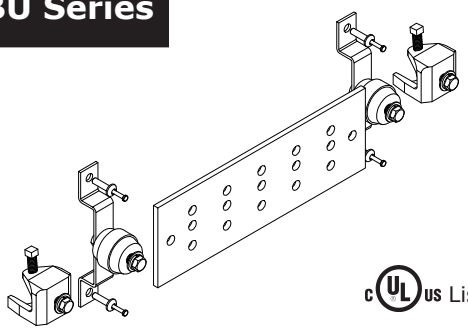
Ground **B**ar with Wall Mounting Brackets, **I**nsulators and a 25' Exothermically Welded **T**ail

GBIA Series



Ground **B**ar with **I**nsulators and Stainless Steel Angle **A**dapters

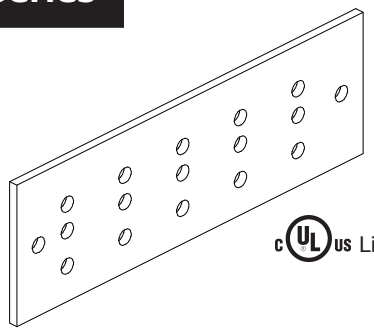
GBU Series



Ground **B**ar **U**niversal with Insulators, Brackets and Zinc Plated Malleable Beam Clamp

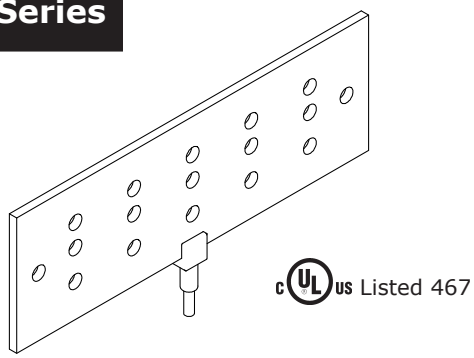
Ground Bar Styles

GB Series



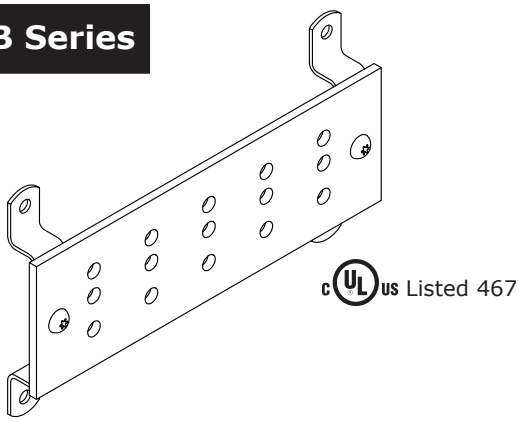
Plain **G**round **B**ar

GBT Series



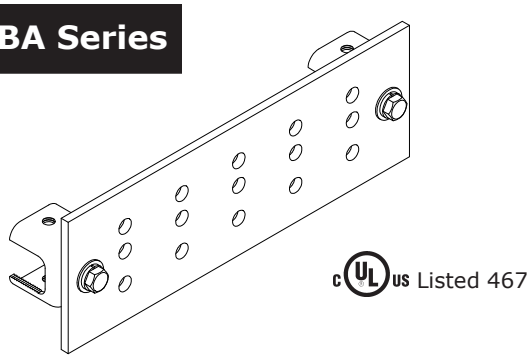
Ground **B**ar with a 25' Exothermically Welded **T**ail

GBB Series



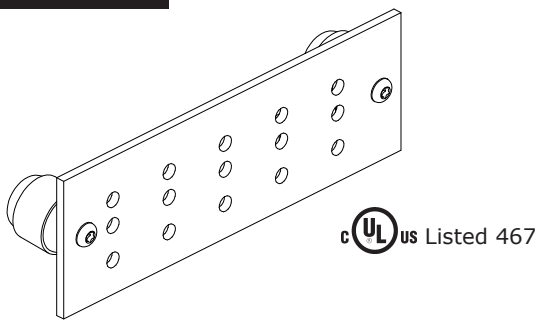
Ground **B**ar with **B**rackets Only

GBA Series



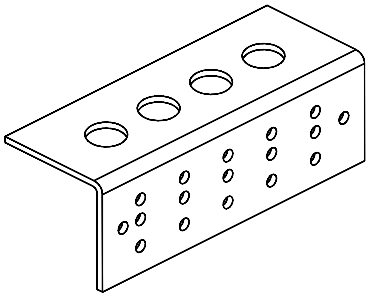
Ground **B**ar with Stainless Steel Angle **A**dapters

GBS Series



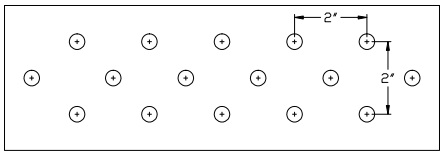
Ground **B**ar with **S**tandoff Insulators Only

BGB Series

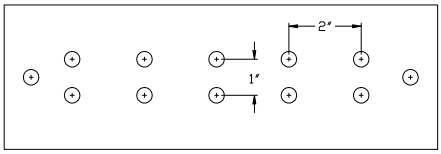


Bent **G**round **B**ar

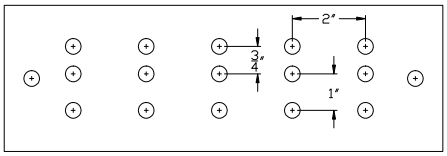
Ground Bar Hole Patterns



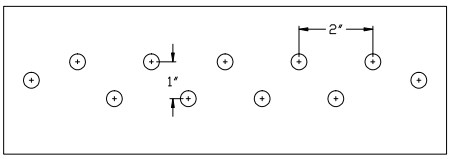
" A "



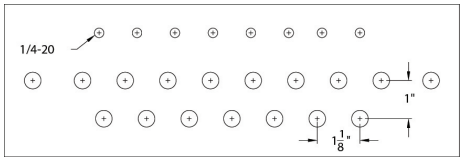
" B "



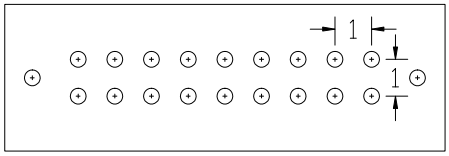
" C "



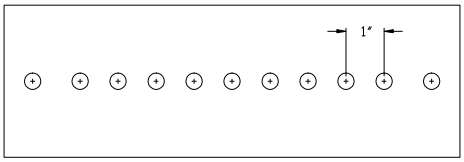
" D "



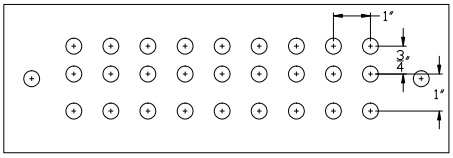
" F "



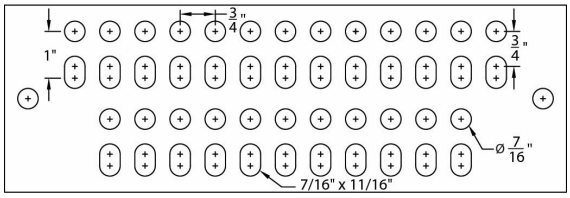
" G "



" H "



" J "

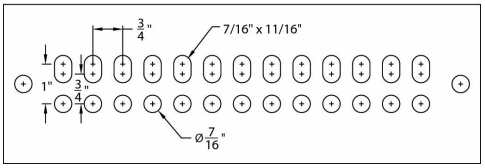


" M "

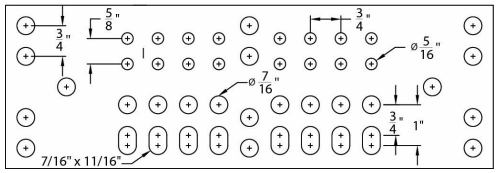
NOTES:

- All holes are 7/16" unless specified differently. To order threaded holes, specify hole size. The standard tapped hole size is 1/4-20 unless specified differently. Add suffix "T" to part number for tapped hole.
- Above hole patterns represent a 12" ground bar.
- All bars are available with electro-tin plating. Add prefix "T" to part number.
- Slotted hole patterns accommodate "B" and "C" spaced two hole lugs (3/4" and 1" on center).

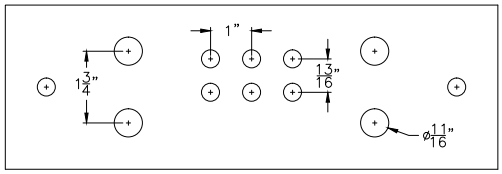
Ground Bar Hole Patterns



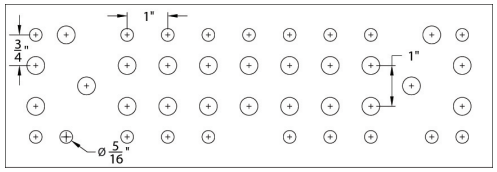
" P "



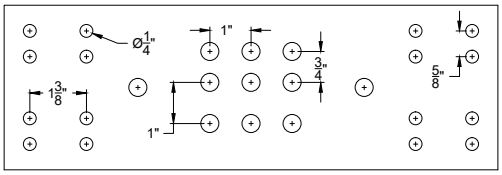
" Q "



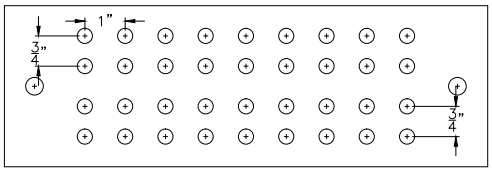
" R "



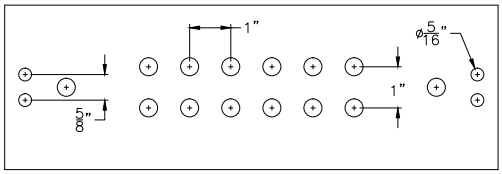
" T "



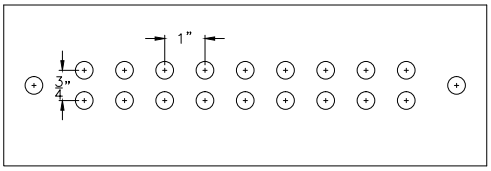
" V "



" W "



" X "



" Z "



" N "

NOTES:

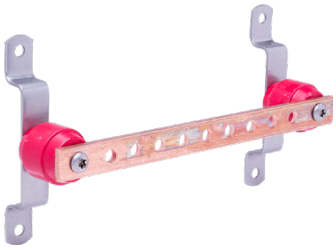
- All holes are 7/16" unless specified differently. To order threaded holes, specify hole size. The standard tapped hole size is 1/4-20 unless specified differently. Add suffix "T" to part number for tapped hole.
- Above hole patterns represent a 12" ground bar.
- All bars are available with electro-tin plating. Add prefix "T" to part number.
- Slotted hole patterns accommodate "B" and "C" spaced two hole lugs (3/4" and 1" on center).

GBI Ground Bars

"H" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14110H	1/4" x 1" x 10"	7	2.1
GBI14112H	1/4" x 1" x 12"	9	2.5
GBI14116H	1/4" x 1" x 16"	13	2.8
GBI14118H	1/4" x 1" x 18"	15	3

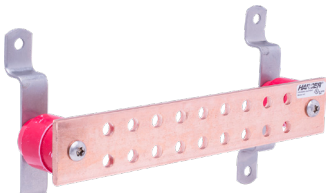
- Accommodates one hole lugs using 3/8" hardware.
- 12" bar pictured. Holes are 7/16" diameter.



"G" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14210G	1/4" x 2" x 10"	14	2.5
GBI14212G	1/4" x 2" x 12"	18	2.8
GBI14216G	1/4" x 2" x 16"	26	3.4
GBI14218G	1/4" x 2" x 18"	30	3.7
GBI14220G	1/4" x 2" x 20"	34	4.2
GBI14224G	1/4" x 2" x 24"	42	4.8

- Accommodates "C" spaced two hole lugs (1" on center).
- 12" bar pictured. Holes are 7/16" diameter.

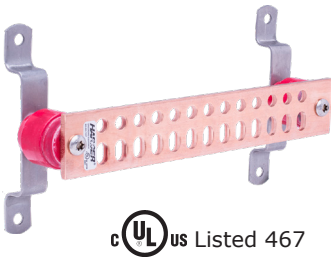


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"P" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14210P	1/4" x 2" x 10"	20	2.5
GBI14212P	1/4" x 2" x 12"	26	2.9
GBI14216P	1/4" x 2" x 16"	34	3.1
GBI14218P	1/4" x 2" x 18"	42	4
GBI14220P	1/4" x 2" x 20"	46	4.2
GBI14224P	1/4" x 2" x 24"	58	4.9

- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".



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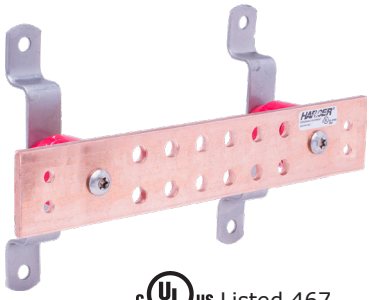
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

GBI Ground Bars

"X" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14210X	1/4" x 2" x 10"	12	2.7
GBI14212X	1/4" x 2" x 12"	16	2.8
GBI14216X	1/4" x 2" x 16"	24	3.5
GBI14218X	1/4" x 2" x 18"	28	3.9
GBI14220X	1/4" x 2" x 20"	32	4.2
GBI14224X	1/4" x 2" x 24"	40	4.8

- Accommodates "A" and "C" spaced two hole lugs (5/8" and 1" on center).
- 12" bar pictured. Holes are 5/16" and 7/16" diameter.



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"C" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14410C	1/4" x 4" x 10"	12	4.2
GBI14412C	1/4" x 4" x 12"	15	4.8
GBI14416C	1/4" x 4" x 16"	21	6
GBI14418C	1/4" x 4" x 18"	24	6.6
GBI14420C	1/4" x 4" x 20"	27	7.3
GBI14424C	1/4" x 4" x 24"	33	8.4
GBI14436C	1/4" x 4" x 36"	51	12.1
GBI14448C	1/4" x 4" x 48"	66	16.4

- Accommodates "B", "C" and "D" spaced two hole lugs (3/4", 1" and 1-3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.



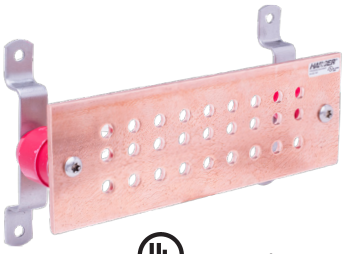
c UL us Listed 467

NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

GBI Ground Bars

"J" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14410J	1/4" x 4" x 10"	21	4.3
GBI14412J	1/4" x 4" x 12"	27	4.6
GBI14416J	1/4" x 4" x 16"	39	6.2
GBI14418J	1/4" x 4" x 18"	45	6.9
GBI14420J	1/4" x 4" x 20"	51	7.3
GBI14424J	1/4" x 4" x 24"	63	8
GBI14436J	1/4" x 4" x 36"	99	11.6
GBI14448J	1/4" x 4" x 48"	132	15.6

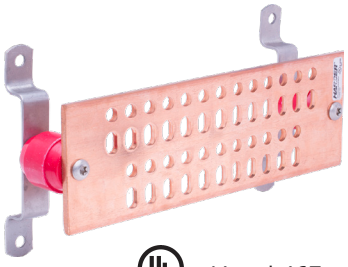


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- Accommodates "B", "C" and "D" spaced two hole lugs (3/4", 1" and 1-3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.

"M" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBI14410M	1/4" x 4" x 10"	36	4.4
GBI14412M	1/4" x 4" x 12"	48	4.6
GBI14416M	1/4" x 4" x 16"	68	5.2
GBI14418M	1/4" x 4" x 18"	80	6.9
GBI14420M	1/4" x 4" x 20"	88	7.3
GBI14424M	1/4" x 4" x 24"	112	8.8
GBI14436M	1/4" x 4" x 36"	176	9.4
GBI14448M	1/4" x 4" x 48"	224	13.5



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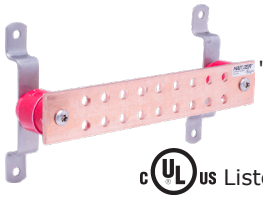
- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".

NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

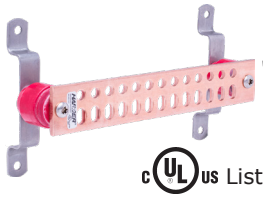
GBI Ground Bar Kits

2” Wide Bar

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)	Kit No.
GBI14210GKT	1/4” x 2” x 10”	G	14	5.5	1
GBI14212GKT	1/4” x 2” x 12”	G	18	6	1
GBI14216GKT	1/4” x 2” x 16”	G	26	7.5	2
GBI14218GKT	1/4” x 2” x 18”	G	30	7.8	2
GBI14220GKT	1/4” x 2” x 20”	G	34	8.1	3
GBI14224GKT	1/4” x 2” x 24”	G	42	9.5	3
GBI14210PKT	1/4” x 2” x 10”	P	20	6	1
GBI14212PKT	1/4” x 2” x 12”	P	26	6.3	1
GBI14216PKT	1/4” x 2” x 16”	P	36	7.3	2
GBI14218PKT	1/4” x 2” x 18”	P	42	7.8	2
GBI14220PKT	1/4” x 2” x 20”	P	46	8.1	2
GBI14224PKT	1/4” x 2” x 24”	P	58	9.5	3



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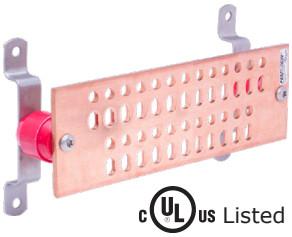
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4” Wide Bar

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)	Kit No.
GBI14410JKT	1/4” x 2” x 10”	J	21	7	2
GBI14412JKT	1/4” x 2” x 12”	J	27	7.6	2
GBI14416JKT	1/4” x 2” x 16”	J	39	10.1	2
GBI14418JKT	1/4” x 2” x 18”	J	45	10.7	2
GBI14420JKT	1/4” x 2” x 20”	J	51	11.4	2
GBI14424JKT	1/4” x 2” x 24”	J	63	12.7	2
GBI14410MKT	1/4” x 2” x 10”	M	36	8.8	3
GBI14412MKT	1/4” x 2” x 12”	M	48	9.5	3
GBI14416MKT	1/4” x 2” x 16”	M	68	10.8	3
GBI14418MKT	1/4” x 2” x 18”	M	80	11.5	3
GBI14420MKT	1/4” x 2” x 20”	M	88	12.1	3
GBI14424MKT	1/4” x 2” x 24”	M	112	13.3	3



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- Refer to page 50 for hole pattern details.
- All kits include the grounding busbar with brackets, insulators, and 1/2 oz. tube of antioxidant (HCAJC1/2).

Kit 1 Includes:
(1) Grounding busbar with brackets & insulators
(3) GECLB62C: #6 compression lug
(2) GECLB22C: #2 compression lug
(2) GECLB22CS: #2 compression lug
(1) GECLB2/02C: 2/0 compression lug
(1) GECLB4/02C: 4/0 compression lug
(18) CS68S: 3/8”-16x1” SS hex head cap screw
(9) BLW6S: 3/8”x1” bonding lug washer
(18) N616S: 3/8”-16 SS hex nut

Kit 2 Includes:
(1) Grounding busbar with brackets & insulators
(4) GECLB62C: #6 compression lug
(3) GECLB22C: #2 compression lug
(3) GECLB22CS: #2 compression lug
(1) GECLB2/02C: 2/0 compression lug
(1) GECLB4/02C: 4/0 compression lug
(24) CS68S: 3/8”-16x1” SS hex head cap screw
(12) BLW6S: 3/8”x1” bonding lug washer
(24) N616S: 3/8”-16 SS hex nut

Kit 3 Includes:
(1) Grounding busbar with brackets & insulators
(8) GECLB62C: #6 compression lug
(6) GECLB22C: #2 compression lug
(6) GECLB22CS: #2 compression lug
(1) GECLB2/02C: 2/0 compression lug
(1) GECLB4/02C: 4/0 compression lug
(44) CS68S: 3/8”-16x1” SS hex head cap screw
(22) BLW6S: 3/8”x1” bonding lug washer
(44) N616S: 3/8”-16 SS hex nut

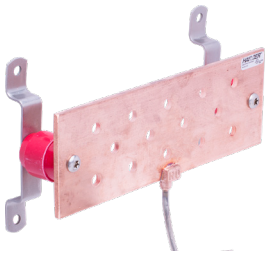
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.



GBIT Ground Bars

"A" Hole Pattern

Part No.	Bar Size	Conductor	No. of Holes	Approx. Each Wt. (lbs.)
GBIT14410A2T	1/4" x 4" x 10"	2T	11	9.4
GBIT14412A2T	1/4" x 4" x 12"	2T	14	9.9
GBIT14416A2T	1/4" x 4" x 16"	2T	20	11.2
GBIT14418A2T	1/4" x 4" x 18"	2T	23	11.7
GBIT14420A2T	1/4" x 4" x 20"	2T	26	12.5
GBIT14424A2T	1/4" x 4" x 24"	2T	32	13.6
GBIT14436A2T	1/4" x 4" x 36"	2T	50	17.2
GBIT14448A2T	1/4" x 4" x 48"	2T	66	21.5

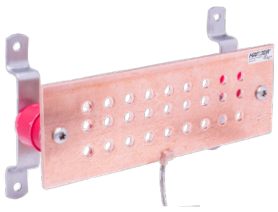


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- 12" bar pictured. Holes are 7/16" diameter.
- Includes a 25' exothermically welded tail.

"J" Hole Pattern

Part No.	Bar Size	Conductor	No. of Holes	Approx. Each Wt. (lbs.)
GBIT14410J2T	1/4" x 4" x 10"	2T	21	9.1
GBIT14412J2T	1/4" x 4" x 12"	2T	27	10.2
GBIT14416J2T	1/4" x 4" x 16"	2T	39	10.8
GBIT14418J2T	1/4" x 4" x 18"	2T	45	11.5
GBIT14420J2T	1/4" x 4" x 20"	2T	51	11.9
GBIT14424J2T	1/4" x 4" x 24"	2T	63	13.7
GBIT14436J2T	1/4" x 4" x 36"	2T	99	17.7
GBIT14448J2T	1/4" x 4" x 48"	2T	132	23



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- Accommodates "B", "BC", "C" and "D" spaced two hole lugs (3/4", Slotted, 1" and 1-3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.
- Includes a 25' exothermically welded tail.

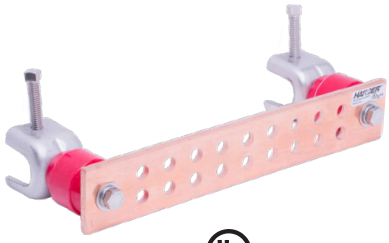
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

GBIA Ground Bars

"Z" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBIA14210Z	1/4" x 2" x 10"	14	3
GBIA14212Z	1/4" x 2" x 12"	18	3.3
GBIA14216Z	1/4" x 2" x 16"	26	3.9
GBIA14218Z	1/4" x 2" x 18"	30	4.1
GBIA14220Z	1/4" x 2" x 20"	34	4.4
GBIA14224Z	1/4" x 2" x 24"	42	4.7

- Accommodates "B" spaced two hole lugs (3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.

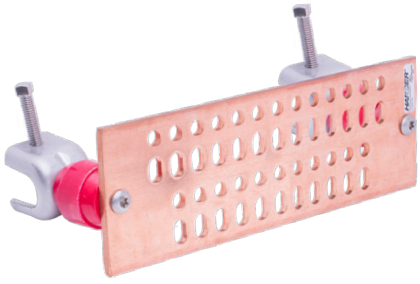


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"M" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBIA14410M	1/4" x 4" x 10"	36	4.2
GBIA14412M	1/4" x 4" x 12"	48	4.6
GBIA14416M	1/4" x 4" x 16"	68	5.5
GBIA14418M	1/4" x 4" x 18"	80	6
GBIA14420M	1/4" x 4" x 20"	88	6.5
GBIA14424M	1/4" x 4" x 24"	112	7.3
GBIA14436M	1/4" x 4" x 36"	176	10
GBIA14448M	1/4" x 4" x 48"	224	13.8

- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".



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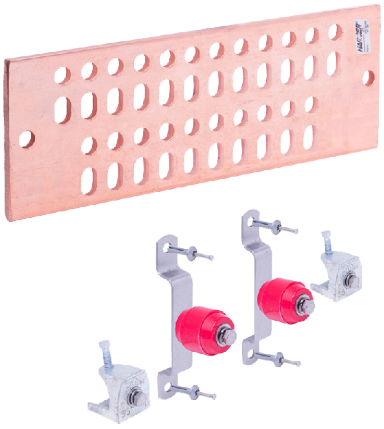
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

GBU Ground Bars

"M" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBU14410M	1/4" x 4" x 10"	36	4.8
GBU14412M	1/4" x 4" x 12"	48	5.2
GBU14416M	1/4" x 4" x 16"	68	6.1
GBU14418M	1/4" x 4" x 18"	80	6.6
GBU14420M	1/4" x 4" x 20"	88	7.1
GBU14424M	1/4" x 4" x 24"	112	7.9
GBU14436M	1/4" x 4" x 36"	176	10.6

- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".

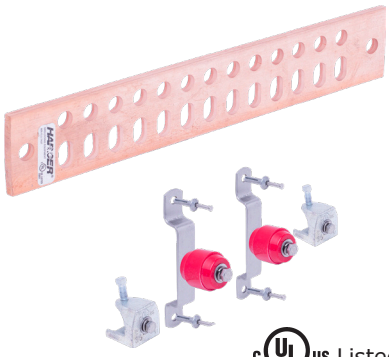


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"P" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBU14210P	1/4" x 2" x 10"	20	3.8
GBU14212P	1/4" x 2" x 12"	26	4.5
GBU14216P	1/4" x 2" x 16"	34	5
GBU14218P	1/4" x 2" x 18"	42	5.3
GBU14220P	1/4" x 2" x 20"	46	5.4
GBU14224P	1/4" x 2" x 24"	58	6

- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".



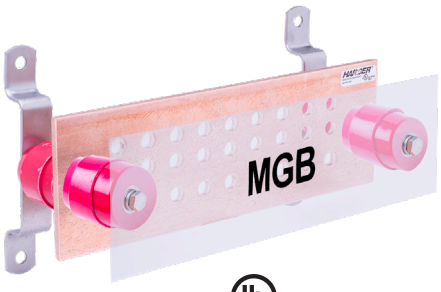
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NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

GBIP Ground Bars

"J" Hole Pattern

Part No.	Bar Size	No. of Holes	Approx. Each Wt. (lbs.)
GBIP14410JMGB	1/4" x 4" x 10"	21	5.8
GBIP14412JMGB	1/4" x 4" x 12"	27	6.7
GBIP14416JMGB	1/4" x 4" x 16"	39	7.4
GBIP14418JMGB	1/4" x 4" x 18"	45	8.7
GBIP14420JMGB	1/4" x 4" x 20"	51	9
GBIP14424JMGB	1/4" x 4" x 24"	66	9.6
GBIP14436JMGB	1/4" x 4" x 36"	99	13.3
GBIP14448JMGB	1/4" x 4" x 48"	132	21



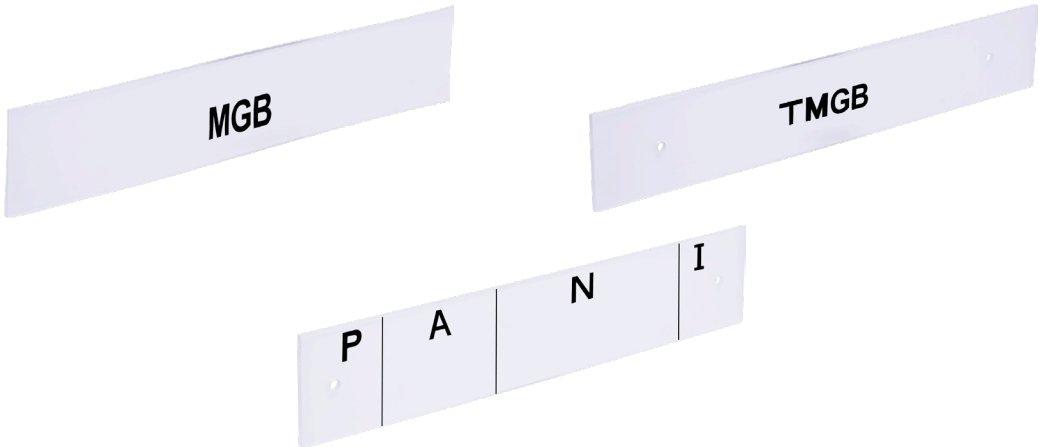
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- Accommodates "B", "C" and "D" spaced two hole lugs (3/4", 1" and 1-3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.
- Protective clear acrylic cover with MGB lettering. Custom lettering available.

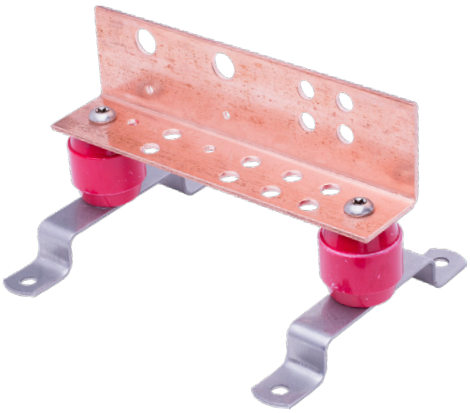
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

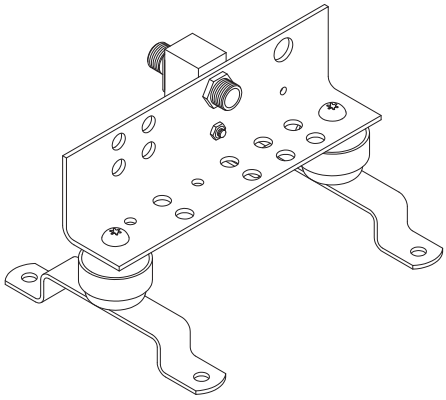
Protective Clear Acrylic Covers

All ground bars are available with protective clear acrylic covers or as standalone cover kits. Letters, markings, and additional color options are available with a minimum lettering height of 3/8”. Standard cover thickness is 1/4” with other thickness available. Contact factory for more information.



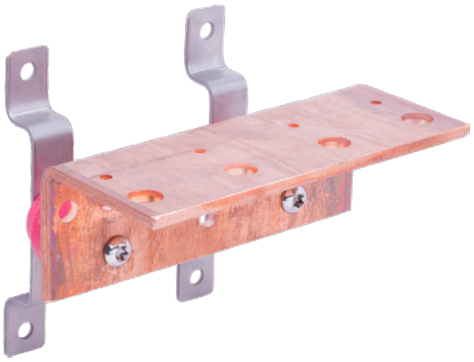
BGB Ground Bars

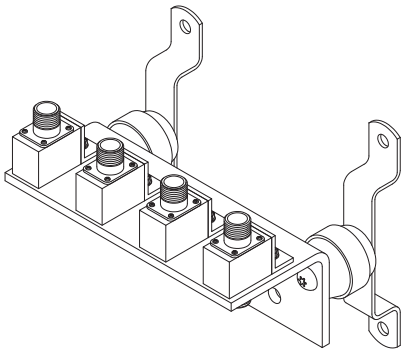




Part No.	Bar Size	No. of Arrestors	Approx. Each Wt. (lbs.)
BGBI1848.75TEL	1/8" x 4" x 8-3/4"	2	2.5
BGBI18413.25TEL	1/8" x 4" x 13-1/4"	4	3.5
BGBI18417.75TEL	1/8" x 4" x 17-3/4"	6	4
BGBI18428TEL	1/8" x 4" x 28"	8	5.5

- Accommodates "B" spaced two hole lugs (3/4" on center).





Part No.	Bar Size	No. of Arrestors	Approx. Each Wt. (lbs.)
BGBI1468ISB4FAA2	1/4" x 6" x 8"	4	5

- Accommodates "C" spaced two hole lugs (1" on center).

NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Accepts bulkhead style surge arrestors with N-Female connectors.
- Can be mounted vertically or horizontally.
- Surge arrestors not included.
- Additional sizes/styles available. Contact factory for more information.

Telco Ground Bars

GBIS1416CGB



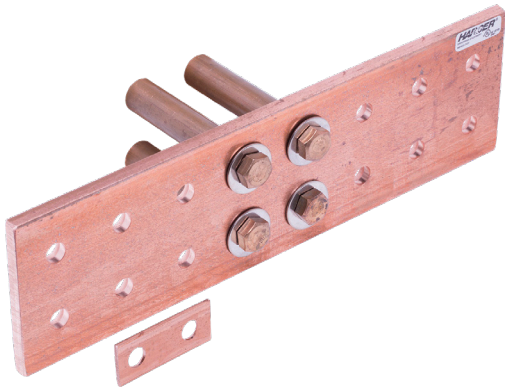
- 1/4" x 1" x 6" electrolytic tough pitch copper alloy 110 bar.
- (3) 10-32 tapped holes designed to fit one hole lugs.
- (2) .281 punched holes designed to fit one hole lugs.
- (1) 1/4-20 tapped hole designed to fit one hole lugs.
- Pre-assembled with two 11/16WINS insulators and screws.
- Approximate weight is 0.5 pound.

GBIS1428EE



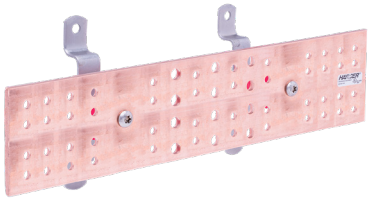
- 1/4" x 2" x 8" electrolytic tough pitch copper alloy 110 bar.
- (6) .438 punched holes designed to fit two hole lugs with 1" on center spacing.
- (4) .313 punched holes designed to fit one hole lugs.
- Pre-assembled with two 7/8WINS and pan head torx screws.
- Approximate weight is 1.25 pounds.

GB38414.25TI



- 3/8" x 4" x 14-1/4" electrolytic tough pitch copper alloy 110 bar.
- 8 sets of 1/2" diameter holes 1-3/4" on center; which accommodates "D" spaced two hole compression lugs.
- Comes with sandwich plate for attaching copper braid or flat strap.
- Includes silicon bronze bolts, copper spacers and stainless flat washers.
- Designed to be used in conjunction with exothermic ground plate XGP3.25/3.254/0 (not included). See page 294 for ground plates.
- Approximate weight is 7.5 pounds.

TIA-607 Pattern Primary Bonding Busbars



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PBB Busbars

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14410PBB	1/4" x 4" x 10"	10	4	4.2
GBI14412PBB	1/4" x 4" x 12"	12	6	4.7
GBI14416PBB	1/4" x 4" x 16"	16	6	6
GBI14418PBB	1/4" x 4" x 18"	20	6	6.6
GBI14420PBB	1/4" x 4" x 20"	24	6	7.2
GBI14424PBB	1/4" x 4" x 24"	28	10	8.3
GBI14436PBB	1/4" x 4" x 36"	40	18	12.7
GBI14448PBB	1/4" x 4" x 48"	52	24	17.7

- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Telecommunications Main Grounding Busbar (TMGB).

TMGB Busbars

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14410TMGB	1/4" x 4" x 10"	10	4	4.2
GBI14412TMGB	1/4" x 4" x 12"	12	6	4.7
GBI14416TMGB	1/4" x 4" x 16"	16	6	6
GBI14418TMGB	1/4" x 4" x 18"	20	6	6.6
GBI14420TMGB	1/4" x 4" x 20"	24	6	7.2
GBI14424TMGB	1/4" x 4" x 24"	28	10	8.3
GBI14436TMGB	1/4" x 4" x 36"	40	18	12.7
GBI14448TMGB	1/4" x 4" x 48"	52	24	17.7

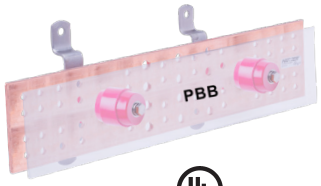
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Primary Bonding Busbar (PBB).

NOTES:
- Meets BICSI and EIA/TIA-607 Standards.
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

TIA-607 Pattern Primary Bonding Busbars

PBB Busbars with Protective Clear Acrylic Cover

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBIP14410PBB	1/4" x 4" x 10"	10	4	5.5
GBIP14412PBB	1/4" x 4" x 12"	12	6	5.7
GBIP14416PBB	1/4" x 4" x 16"	16	6	7.4
GBIP14418PBB	1/4" x 4" x 18"	20	6	8
GBIP14420PBB	1/4" x 4" x 20"	24	6	8.7
GBIP14424PBB	1/4" x 4" x 24"	28	10	10
GBIP14436PBB	1/4" x 4" x 36"	40	18	13.2
GBIP14448PBB	1/4" x 4" x 48"	52	24	20

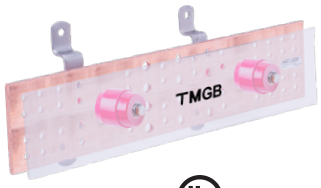


c UL us Listed 467

- 1/4" thick x 4" wide electrolytic tough pitch copper alloy 110.
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Telecommunications Main Grounding Busbar (TMGB).
- PBB is Standard black lettering with a minimum lettering height of 3/8". Other letters, markings, and color options available.

TMGB Busbars with Protective Clear Acrylic Cover

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBIP14410TMGB	1/4" x 4" x 10"	10	4	5.5
GBIP14412TMGB	1/4" x 4" x 12"	12	6	5.7
GBIP14416TMGB	1/4" x 4" x 16"	16	6	7.4
GBIP14418TMGB	1/4" x 4" x 18"	20	6	8
GBIP14420TMGB	1/4" x 4" x 20"	24	6	8.7
GBIP14424TMGB	1/4" x 4" x 24"	28	10	10
GBIP14436TMGB	1/4" x 4" x 36"	40	18	13.2
GBIP14448TMGB	1/4" x 4" x 48"	52	24	20



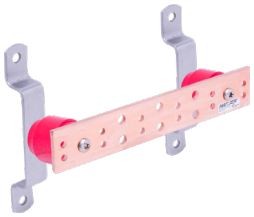
c UL us Listed 467

- 1/4" thick x 4" wide electrolytic tough pitch copper alloy 110.
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Primary Bonding Busbar (PBB).
- TMGB is Standard black lettering with a minimum lettering height of 3/8". Other letters, markings, and color options available.

NOTES:

- Meets BICSI and EIA/TIA-607 Standards.
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

TIA-607 Pattern Secondary Bonding Busbars



c UL us Listed 467

SBB Busbars

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14210SBB	1/4" x 2" x 10"	4	3	2.7
GBI14212SBB	1/4" x 2" x 12"	6	3	2.9
GBI14216SBB	1/4" x 2" x 16"	8	3	3.6
GBI14218SBB	1/4" x 2" x 18"	10	3	3.9
GBI14220SBB	1/4" x 2" x 20"	12	4	4.2
GBI14224SBB	1/4" x 2" x 24"	14	5	4.7

- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" hole sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Telecommunications Grounding Busbar (TGB).

TGB Busbars

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14210TGB	1/4" x 2" x 10"	4	3	2.7
GBI14212TGB	1/4" x 2" x 12"	6	3	2.9
GBI14216TGB	1/4" x 2" x 16"	8	3	3.6
GBI14218TGB	1/4" x 2" x 18"	10	3	3.9
GBI14220TGB	1/4" x 2" x 20"	12	4	4.2
GBI14224TGB	1/4" x 2" x 24"	14	5	4.7

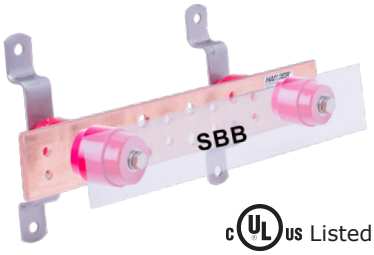
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" hole sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Secondary Bonding Busbar (SBB).

NOTES:
- Meets BICSI and EIA/TIA-607 Standards.
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

TIA-607 Pattern Secondary Bonding Busbars

SBB Busbars with Protective Clear Acrylic Cover

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBIP14210SBB	1/4" x 2" x 10"	4	3	3.5
GBIP14212SBB	1/4" x 2" x 12"	6	3	3.8
GBIP14216SBB	1/4" x 2" x 16"	8	3	4
GBIP14218SBB	1/4" x 2" x 18"	10	3	4.1
GBIP14220SBB	1/4" x 2" x 20"	12	4	5
GBIP14224SBB	1/4" x 2" x 24"	14	5	5.5

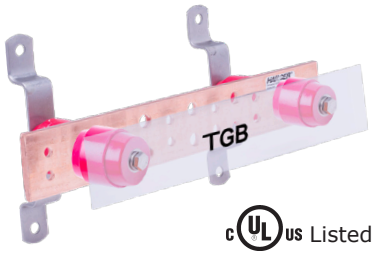


c UL us Listed 467

- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Telecommunications Grounding Bubar (TGB).
- SBB is Standard black lettering with a minimum lettering height of 3/8”. Other letters, markings, and color options available.

TGB Busbars with Protective Clear Acrylic Cover

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBIP14210TGB	1/4" x 2" x 10"	4	3	3.5
GBIP14212TGB	1/4" x 2" x 12"	6	3	3.8
GBIP14216TGB	1/4" x 2" x 16"	8	3	4
GBIP14218TGB	1/4" x 2" x 18"	10	3	4.1
GBIP14220TGB	1/4" x 2" x 20"	12	4	5
GBIP14224TGB	1/4" x 2" x 24"	14	5	5.5



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- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Also referred to as a Secondary Bonding Busbar (SBB).
- TGB is Standard black lettering with a minimum lettering height of 3/8”. Other letters, markings, and color options available.

NOTES:

- Meets BICSI and EIA/TIA-607 Standards.
- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix “T” to part number.
- Additional sizes available. Contact factory for more information.

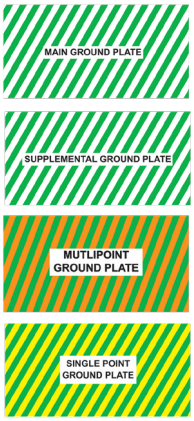
FAA-STD-019f Compliant Ground Plate Kits

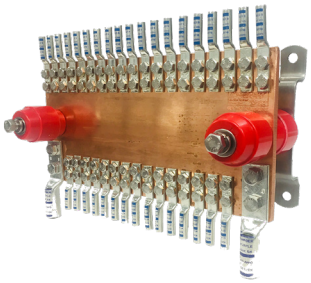
Harger provides ground plate kits that are UL Listed and compliant with FAA-STD-019f. These kits are designed to save installation labor and come assembled with all the necessary hardware. By including the required washers, mathematical calculations to determine bolt clamp load are no longer required.

Ground Plate Kits

Part No.	Bar Size	Plate Type	Pre-Installed Lugs	
			#6 AWG	4/0 AWG
GBIP14412FAAMGPKIT	1/4" x 4" x 12"	Main	21	2
GBIP14412FAASGPKIT	1/4" x 4" x 12"	Supplemental		
GBIP14412FAAMPGPKIT	1/4" x 4" x 12"	Mulit Point		
GBIP14412FAASPGPKIT	1/4" x 4" x 12"	Single Point		
GBIP14612FAAMGPKIT	1/4" x 6" x 12"	Main	31	
GBIP14612FAASGPKIT	1/4" x 6" x 12"	Supplemental		
GBIP14612FAAMPGPKIT	1/4" x 6" x 12"	Mulit Point		
GBIP14612FAASPGPKIT	1/4" x 6" x 12"	Single Point		

Ships assembled with pre-installed #6 AWG and 4/0 AWG compression lugs, 1/2 oz. packet of antioxidant and a protective acrylic cover with the required markings and coloring. Addtional sizes available.





Above bar represents a 1/4" x 6" x 12" ground bar



Equipment Ground Bar Kits

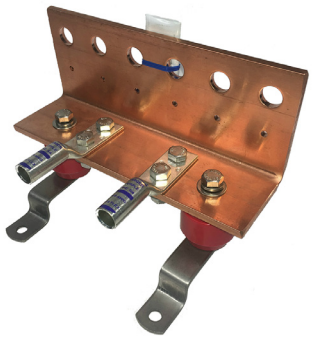
Part No.	Orientation	Length
RGBHKIT141.251925FAA	Horizontal	19-1/4" (488 mm)
RGBVKIT1471.2536FAA	Vertical	36" (914 mm)
RGBVKIT141.2548FAA	Vertical	48" (1220 mm)

These bars are suitable for mounting directly into standard communication racks. Kits include (1) #6 AWG compression lug and a 1/2 oz. packet of antioxidant. The bar is assembled with the required number of machine screws based on the length.

Bulkhead Ground Plate Kits

Part No.	No. of Arrestors	Length
BGBI1469ISB6FAAKIT	6	9" (228 mm)
BGBI14618ISB14FAAKIT	12	18" (457 mm)
BGBI14627ISB18FAAKIT	18	27" (685 mm)

Typically mounted near an antenna or communications entry, these bent ground plates are designed to accept IS-B bulkhead type surge arrestors. Included in these kits are (2) factory installed #4/0 AWG compression lugs and a 1/2 oz. packet of antioxidant.

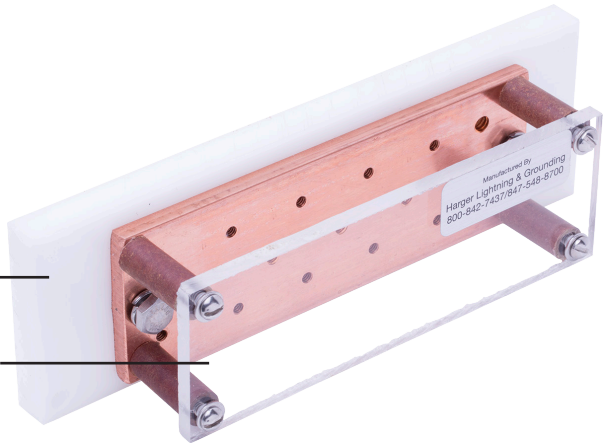


NOTES:

- Manufactured from electrolytic tough pitch copper alloy 110.
- Electro-tin plating available. When ordering, add prefix "T" to part number.
- Additional sizes available. Contact factory for more information.

FAA Style Ground Bars

GRDASSHDPERS



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- 1/4" x 2" x 6" electrolytic tough pitch copper alloy 110 bar.
- (10) 8-32 tapped holes, (4) 10-32 tapped holes and (2) 1/4-20 tapped holes.
- 1/4" thick protective clear acrylic cover.
- 1/2" x 2.5" x 8" HDPE mounting plate.
- Approximate weight is 5 pounds.

FAA Style Protective Acrylic Covers

All ground bars are available with protective clear acrylic covers or as standalone cover kits. Letters, markings, and additional color options are available with a minimum lettering height of 3/8". Standard cover thickness is 1/4" with other thickness available. Contact factory for more information.





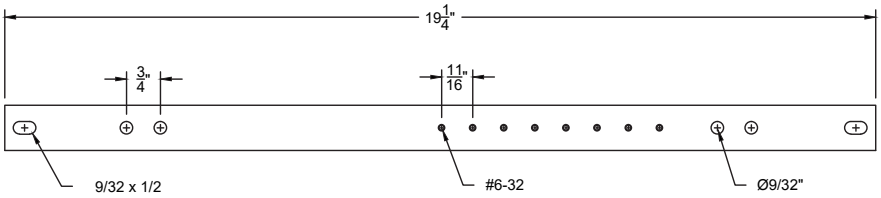
Telecommunications Equipment Rack Grounding Busbars & Kits

Telecommunications Equipment Rack Grounding Busbars are available as bar only or in kit form. All bars are manufactured from 1/4" electrolytic tough pitch copper alloy 110. Designed to fit 19", 23" and 35" equipment racks.

RGBH14119.25

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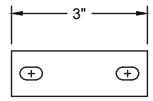




Horizontal Bars

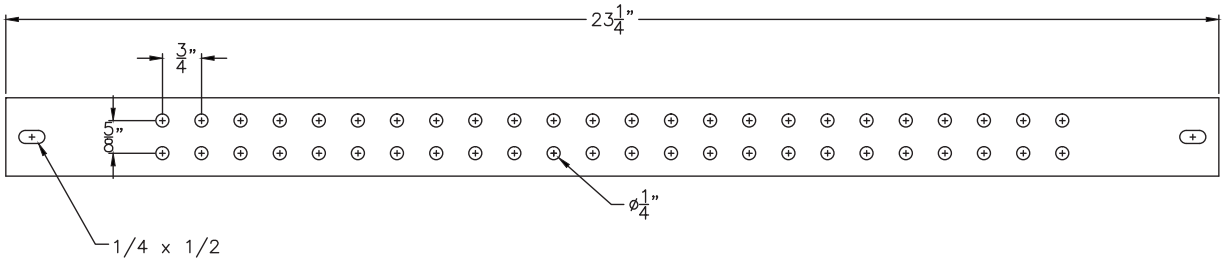
Part No.	Bar Size	Electro Tin Plated	Approx. Each Wt. (lbs.)
RGBH14119.25	1/4" x 1" x 19-1/4"	No	2
TRGBH14119.25	1/4" x 1" x 19-1/4"	Yes	2
RGBH14123.25	1/4" x 1" x 23-1/4"	No	3
TRGBH14123.25	1/4" x 1" x 23-1/4"	Yes	3

- Includes 3" bar splice plate.



Bar Splice Plate

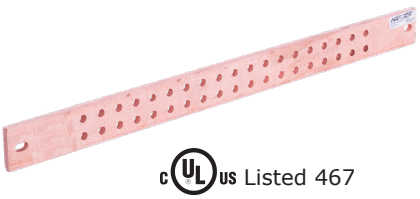
RGBH141.523.25A



Horizontal Bars

Part No.	Bar Size	Electro Tin Plated	Approx. Each Wt. (lbs.)
RGBH141.519.25A	1/4" x 1-1/2" x 19-1/4"	No	3
TRGBH141.519.25A	1/4" x 1-1/2" x 19-1/4"	Yes	3
RGBH141.523.25A	1/4" x 1-1/2" x 23-1/4"	No	4
TRGBH141.523.25A	1/4" x 1-1/2" x 23-1/4"	Yes	4

- Accommodates "A" spaced two hole lugs.



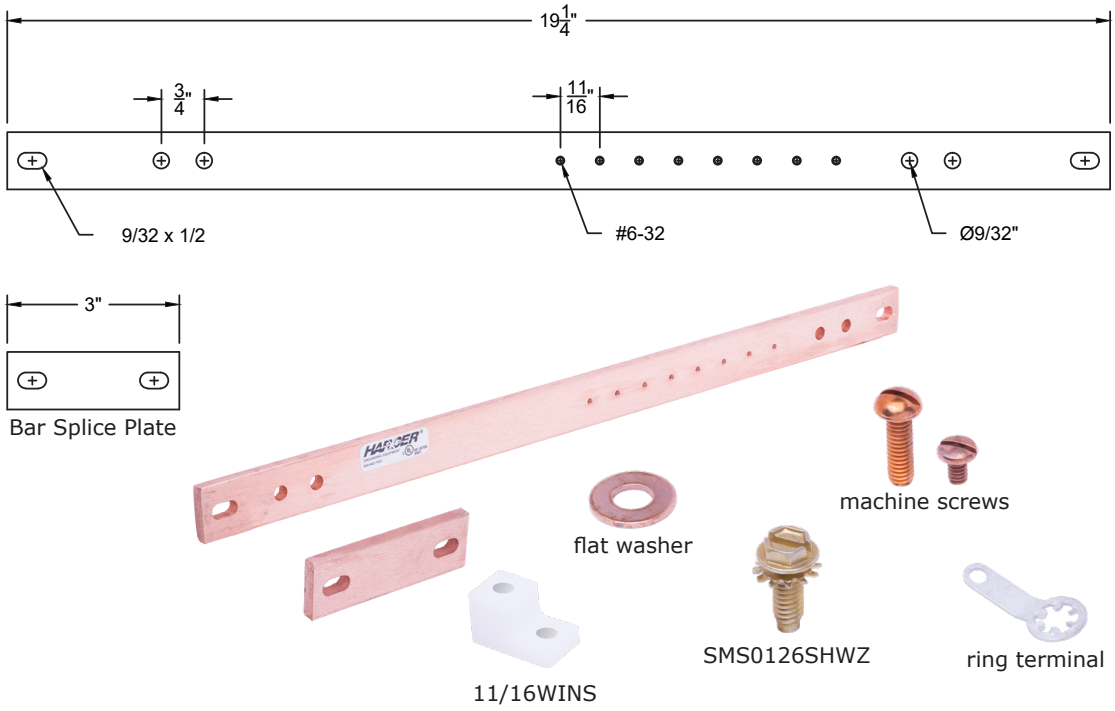
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Telecommunications Equipment Rack Grounding Busbars & Kits

Telecommunications Equipment Rack Grounding Busbars are available as bar only or in kit form. All bars are manufactured from 1/4" electrolytic tough pitch copper alloy 110. Designed to fit 19", 23" and 35" equipment racks.

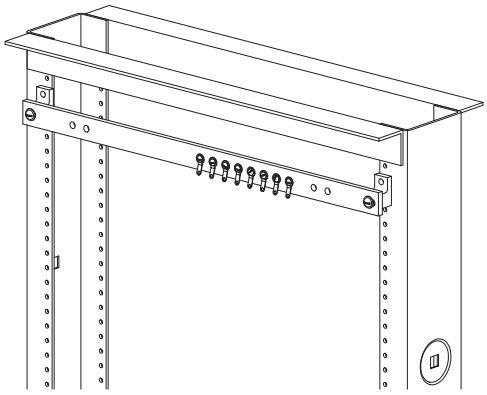
RGBHKIT14119.25

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Horizontal Kits

Part No.	Bar Size	Electro Tin Plated	Approx. Each Wt. (lbs.)
RGBHKIT14119.25	1/4" x 1" x 19-1/4"	No	1.8
TRGBHKIT14119.25	1/4" x 1" x 19-1/4"	Yes	1.8
RGBHKIT14123.25	1/4" x 1" x 23-1/4"	No	4
TRGBHKIT14123.25	1/4" x 1" x 23-1/4"	Yes	4



Kit Includes:

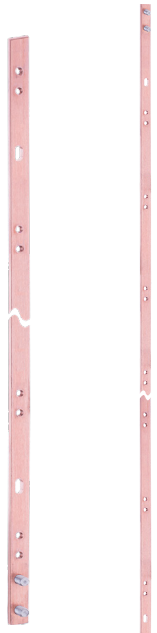
(1) 1/4" electrolytic tough pitch copper alloy 110 ground bar
(1) 3" bar splice plate with 2 slotted holes
(2) 11/16WINS: white delrin insulator
(2) SMS0126SHWZ: 12-24 x 5/8" hex washer head thread forming screw
(2) #12-24 x 3/4" copper machine screw
(2) #12 copper flat washer
(8) #6-32 x 1/4" copper machine screw
(8) #6 ring terminal

Telecommunications Equipment Rack Grounding Busbars & Kits

Vertical Bars

Part No.	Bar Size	Electro Tin Plated	Approx. Each Wt. (lbs.)
RGBV145836A	1/4" x 5/8" x 36"	No	2
TRGBV145836A	1/4" x 5/8" x 36"	Yes	2
RGBV145872A	1/4" x 5/8" x 72"	No	4
TRGBV145872A	1/4" x 5/8" x 72"	Yes	4

- Manufactured from electrolytic tough pitch copper alloy 110.
- Accommodates one hole lug or two hole "A" spaced lugs (5/8" on center).
- Elongated mounting holes.
- 36" bar has two 5/16-18 diameter PEM studs 1" on center at one end for ground conductor connection.
- 72" bar has four 5/16-18 diameter PEM studs (two at each end) 1" on center for ground conductor connections.



36"

72"

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Vertical Kits

Part No.	Bar Size	Electro Tin Plated	Approx. Each Wt. (lbs.)
RGBVKIT145836A	1/4" x 5/8" x 36"	No	3.5
TRGBVKIT145836A	1/4" x 5/8" x 36"	Yes	3.5
RGBVKIT145872A	1/4" x 5/8" x 72"	No	7
TRGBVKIT145872A	1/4" x 5/8" x 72"	Yes	7

- Manufactured from electrolytic tough pitch copper alloy 110.
- Accommodates one or two hole "A" spaced compression lugs (5/8" on center).
- Elongated mounting holes.
- 36" bar has two 5/16-18 diameter PEM studs 1" on center at one end for ground conductor connection.
- 72" bar has four 5/16-18 diameter PEM studs (two at each end) 1" on center for ground conductor connections.

Kit Includes:

(1) Vertical Equipment Rack Grounding Busbar
(8) CS44S: 1/4"-20 x 1/2" stainless steel hex head cap screw
(3) 11/16WINS: white delrin insulator
(4) LW5S: 5/16" stainless steel lock washer
(8) LW4S: 1/4" stainless steel lock washer
(3) SMS0126SHWZ: #12-24 x 5/8" hex washer head thread forming screw
(4) N518S: 5/16"-18 stainless steel hex nut
(1) GECLB22C: two hole long barrel compression lug



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LW5S &
LW4S



N518S



GECLB22C



11/16WINS

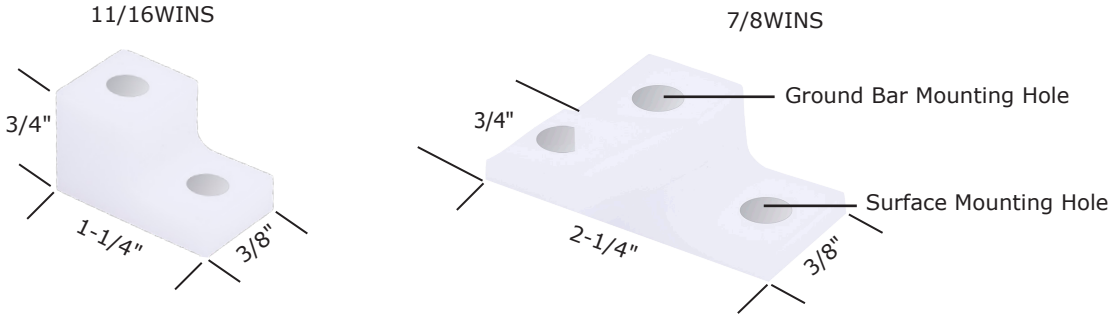


CS44S



SMS0126SHWZ

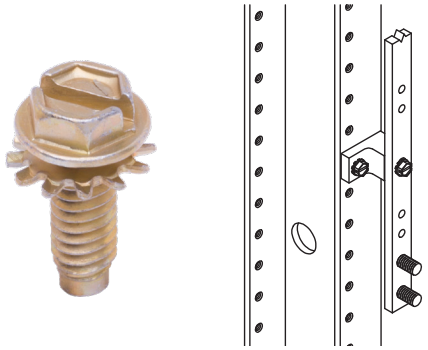
Standoff Insulators - White



Part No.	Approx. Each Wt. (lbs.)
11/16WINS	0.02
7/8WINS	0.04

- Manufactured from Delrin material.
- For use with 1" wide or less ground bars.
- Surface mounting hole 1/4" in diameter.
- Ground bar mounting hole 1/8" in diameter (self-tapping).

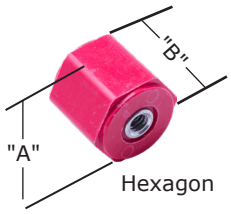
Thread Forming Screw



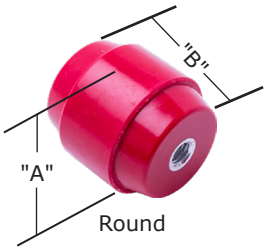
Part No.	Approx. Each Wt. (lbs.)
SMS0126SHWZ-50	0.5

- 12-24 x 5/8" zinc plated, thread forming, paint removing, hex washer head screw with external washer.
- Used with white standoff insulators (11/16WINS & 7/8WINS).
- Each Part No. is a package of 50 screws.

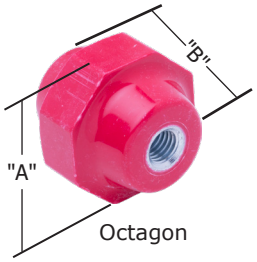
Standoff Insulators - Red



Hexagon



Round



Octagon

Part No.	"A"	"B"	Shape	Thread Size	Voltage Rating	Tensile Strength (lbs.)	Approx. Each Wt. (lbs.)
1100A1	1"	1"	Hex	1/4-20 x 1/4 AL	600	1200	0.1
4150S2	2"	1-1/2"	Oct	1/4-20 x 1/2 STL	1500	3000 - 4500	0.2
R4150S3	1-3/4"	1-1/2"	Round	5/16-18 x 3/8 STL	1500	2500 - 2700	0.3
R4150A4	1-3/4"	1-7/8"	Round	3/8-16 x 9/16 AL	2000	2500 - 2700	0.3
R4200S5	1-3/4"	2"	Round	3/8-16 x 5/8 STL	2500	2500 - 2700	0.4
4200S6	2"	2"	Oct	1/2-13 x 5/8 STL	2500	3000 - 4500	0.4
5250A5	2-1/2"	2-1/2"	Oct	3/8-16 x 5/8 AL	3200	5000 - 5700	0.5
5263A8	2-1/2"	2-5/8"	Oct	5/8-11 x 3/4 AL	3400	5000 - 5700	0.6

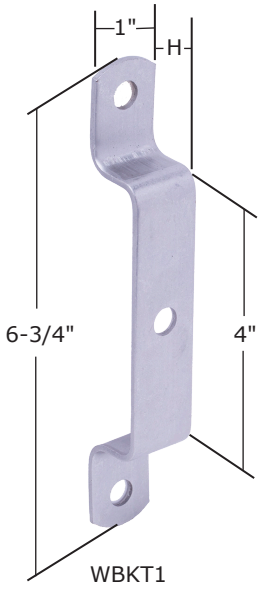
- Manufactured from glass reinforced thermoset polyester.
- Additional sizes available. Contact factory for more information.

Mounting Brackets

Wall Mount

Part No.	Mounting Hole Size	"H"	Material	Heavy Duty	Approx. Each Wt. (lbs.)
WBKT1	3/8"	1"	SS	No	0.3
WBKT1HD	1/2"	1"	Z/P Steel	Yes	0.8
WBKT1HDS	5/8"	1"	SS	Yes	0.4
WBKT2	3/8"	2"	SS	No	0.4
WBKT3	3/8"	3"	SS	No	0.4
WBKT4	3/8"	4"	SS	No	0.4

- Manufactured from 304 series stainless steel or zinc plated steel.
- Additional sizes available. Contact factory for more information.



WBKT1

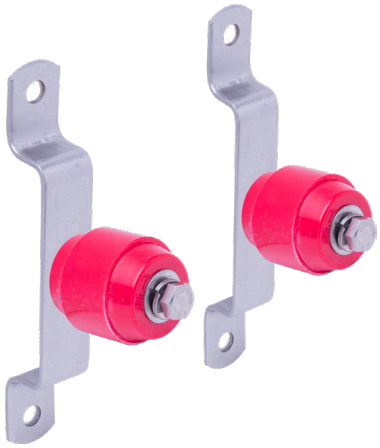
Mounting Brackets

Wall Mount Kit

Part No.	Mounting Hole Size	Material	Heavy Duty	Approx. Each Wt. (lbs.)
WBKT1KIT	3/8"	SS	No	1.2

- Manufactured from 304 series stainless steel.
- Additional sizes available. Contact factory for more information.

Kit Includes:
(2) WBKT1: stainless steel ground bar bracket
(2) R4150A4: round insulator
(2) CS66S: 3/8"-16 x 3/4" stainless steel hex head cap screw
(2) W6S: 3/8" stainless steel flat washer
(2) LW6S: 3/8" stainless steel lock washer

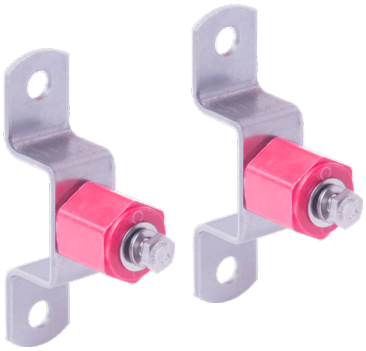


Wall Bracket Kit

Part No.	Mounting Hole Size	Material	Heavy Duty	Approx. Each Wt. (lbs.)
WBKTR56KIT	3/8"	SS	No	0.4

- Manufactured from 304 series stainless steel.
- Additional sizes available. Contact factory for more information.

Kit Includes:
(2) WBKTR56: 1" stainless steel wall bracket
(2) 1100A1: 1/4" x 1" x 1"hex insulator
(2) CS44S: 1/4"-20 x 1/2" stainless steel hex head cap screw
(2) CS45S: 1/4"-20 x 5/8" stainless steel hex head cap screw
(4) W4S: 1/4" stainless steel flat washer
(2) LW4S: 1/4" stainless steel lock washer



Universal Busbar Mounting Kit

Part No.	Approx. Each Wt. (lbs.)
GBUKIT	2.3

- Provides material for either a Shelter or a Tower mount.

Kit Includes:
(2) WBKT1: stainless steel ground bar bracket (Shelter)
(2) MBC3816: malleable iron angle adapters (Tower)
(2) R4150A4: round insulator
(4) 280: 1/4" x 1" drive pin
(2) CS65S: 3/8"-16 x 5/8" stainless steel hex head cap screw
(2) CS66S: 3/8"-16 x 3/4" staniless steel hex head cap screw
(4) W6S: 3/8" stainless steel flat washer
(4) LW6S: 3/8" stainless steel split lock washer



Stainless Steel Angle Adapters

Part No.	Approx. Each Wt. (lbs.)
SSAA	0.5
SSAAKIT	1.6

- Manufactured from 304 series stainless steel.
- SSAAKIT includes two assemblies (pictured). 3/8" stainless steel hardware fastens kit to ground bar.
- SSAAKIT also includes R4150A4 insulators.
- Will accommodate up to 1" thick material.



SSAA



SSAAKIT

"Do Not Disconnect" Tag

Part No.	Material	Approx. Each Wt. (lbs.)
GRNTAGDND	Brass	0.05

- Used in Data Center and In-Building Telecommunications Grounding Systems to mark both ends of grounding/bonding conductors.
- 2" diameter brass tag with 1/2" high black filled lettering.
- Made from corrosion resistant brass.
- Has a round hole for mounting, screwing or wire tying into position.



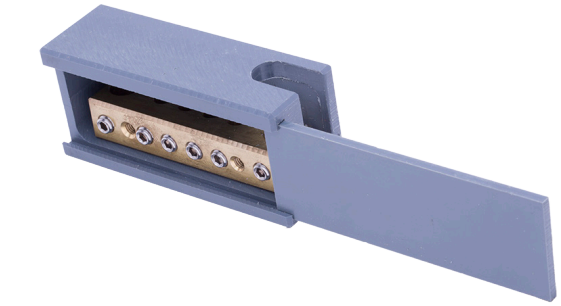
Network Building Ground Tag

Part No.	Material	Pieces per Part No.
GRNTAG607PK10	Plastic	10

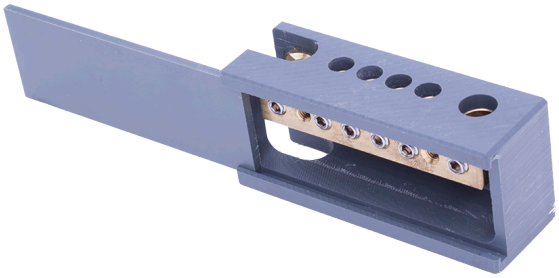
- Dimensions are 2.125" x 3.75".
- Yellow tag with green text.
- Tag is UV Resistant.



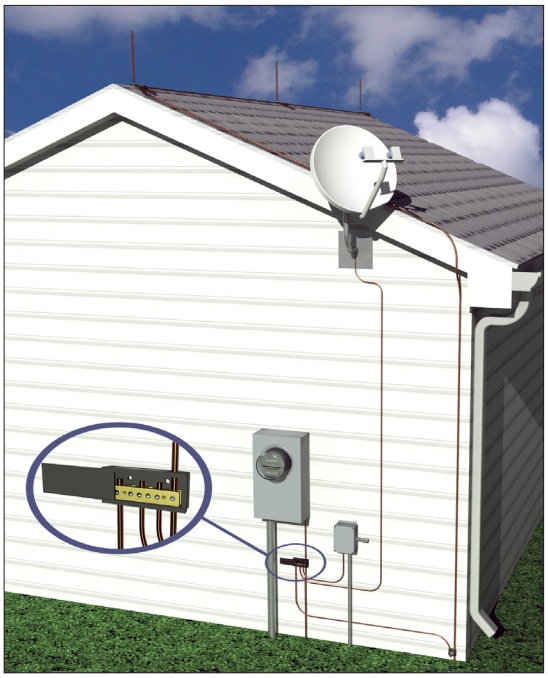
Intersystem Bonding Connection



Top View



Bottom View



Part No.	Approx. Each Wt. (lbs.)
IBTD	1

- Intersystem Bonding Termination Device
- Accepts one 6-1 AWG grounding electrode conductor, four 14-4 AWG bonding conductors and one Class I copper lightning conductor.
- Plastic case, brass terminal with stainless steel hardware.
- Mounting hardware included.
- Slide in, snap fit lid design for easy installation and inspection.

TECHNICAL NOTES: (Summarized)

An external accessible intersystem bonding termination for connecting intersystem bonding and grounding conductors at the service equipment and at the disconnecting means for any additional buildings or structures.*

* NEC 2023 Article 250.94 Bonding For Other Systems

Ground Bus Systems

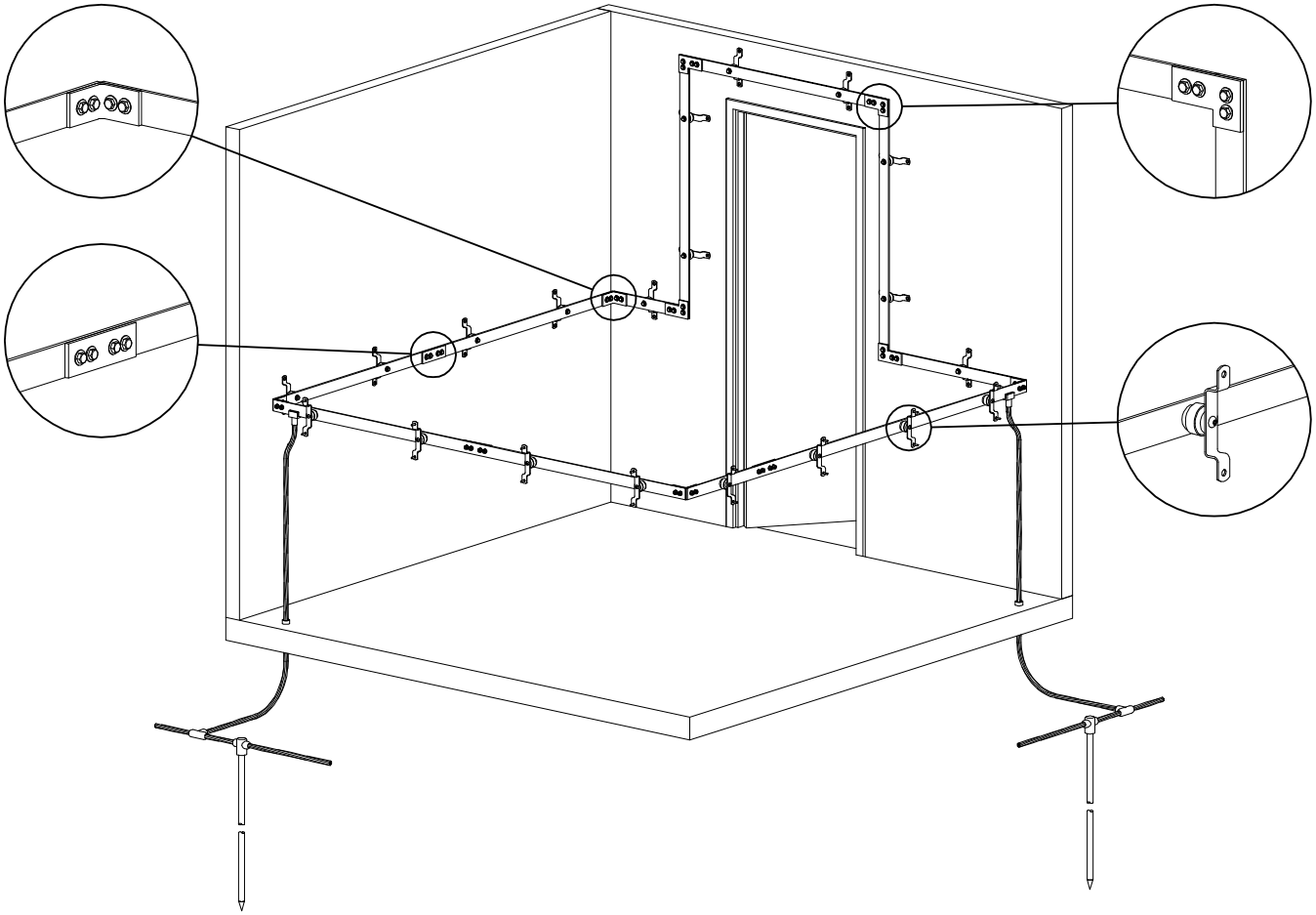
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Elbows & Splicers with Kits	81
Static Ground Kits	82

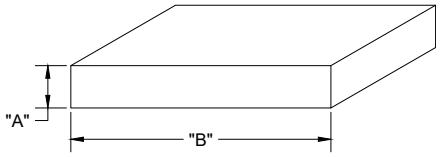
Introduction

Custom Ground Bus Systems

Harger Ground Bus Systems offer flexibility, ease of installation, and superior design. A variety of elbows, insulators, splice plates and bars ensure that custom design specifications are met. Examples of Ground Bus System applications: clean rooms for chemical storage, ammunition depots, paints & inks, data centers, switch gear rooms, testing laboratories and pharmaceuticals.

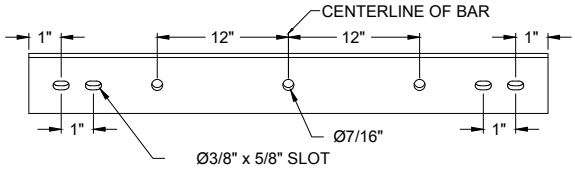


Copper Ground Busbars

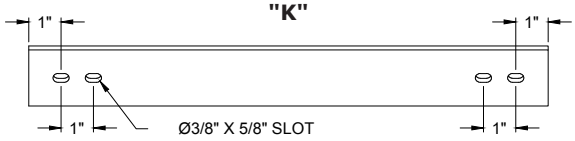


A (Thickness)	B (Width)
1/8"	3/8", 1/2", 5/8", 3/4", 7/8",1", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2", 3", 4" and 6"
1/4"	1/2", 5/8", 3/4",1", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2", 3", 4", 5", 6" and 8"
3/8"	1/2", 5/8", 3/4",1", 1-1/4", 1-1/2", 2", 2-1/2", 3",3-1/2", 4", 5" and 6"
1/2"	3/4",1", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2", 3",3-1/2", 4", 5", 6" and 8"
3/4"	1", 1-1/4", 1-1/2", 2", 2-1/2", 3",3-1/2", 4", 5", 6", 7-3/4" and 8"

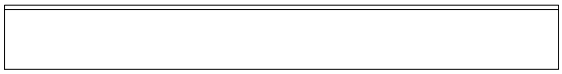
• Additional sizes available. Contact factory for more information.



"K"



"S"



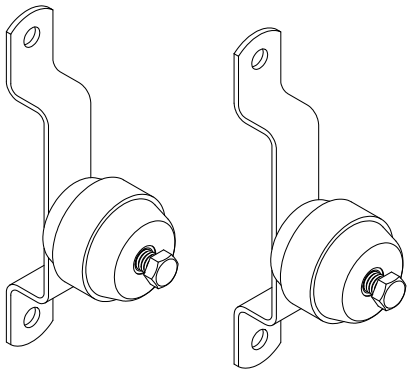
"N"

Hole patterns, K, S, and N, are offered as standard part numbers. Custom hole patterns are available to meet individual project requirements.

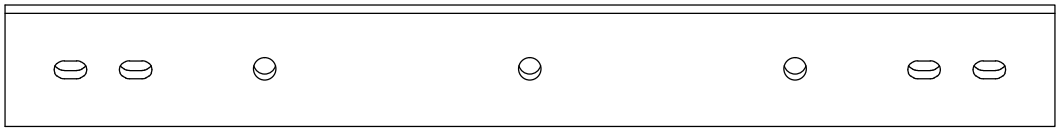
Insulators & Mounting Brackets

Stand-off insulators, mounting brackets and hardware are all available from Harger.
For insulators and mounting brackets see pages 71 & 72.

To provide proper support, bars should be mounted every 2 to 4 feet.



Ground Bus Numbering System

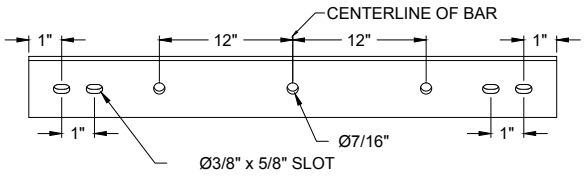


CB 14 2 144 K

- CB — Material ("CB" = copper bar, "ALB" = aluminum bar)
- 14 — Thickness (in.)
- 2 — Width (in.)
- 144 — Length (in.)
- K — Hole Pattern

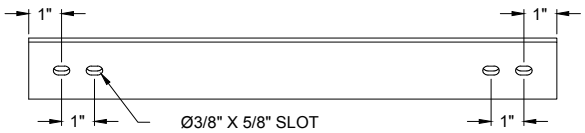
"K" Hole Pattern

Part No.	Thickness	Width	Length	Approx. Each Wt. (lbs.)
CB141120K	1/4"	1"	120"	10
CB141144K	1/4"	1"	144"	12
CB141.5120K	1/4"	1-1/2"	120"	15
CB141.5144K	1/4"	1-1/2"	144"	18
CB142120K	1/4"	2"	120"	20
CB142144K	1/4"	2"	144"	24



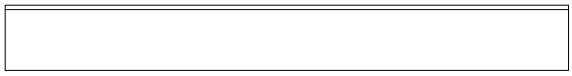
"S" Hole Pattern

Part No.	Thickness	Width	Length	Approx. Each Wt. (lbs.)
CB141120S	1/4"	1"	120"	10
CB141144S	1/4"	1"	144"	12
CB141.5120S	1/4"	1-1/2"	120"	15
CB141.5144S	1/4"	1-1/2"	144"	18
CB142120S	1/4"	2"	120"	20
CB142144S	1/4"	2"	144"	24



"N" Hole Pattern

Part No.	Thickness	Width	Length	Approx. Each Wt. (lbs.)
CB141120N	1/4"	1"	120"	10
CB141144N	1/4"	1"	144"	12
CB141.5120N	1/4"	1-1/2"	120"	15
CB141.5144N	1/4"	1-1/2"	144"	18
CB142120N	1/4"	2"	120"	20
CB142144N	1/4"	2"	144"	24



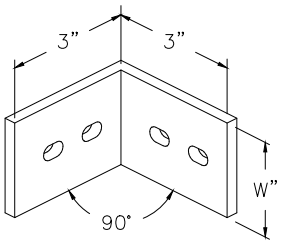
Solid bar. No holes punched.

NOTES:
- Slotted hole size is 3/8" x 5/8" spaced 1" on center.
- Additional sizes available.

Elbows & Splicers with Kits

90° Elbows

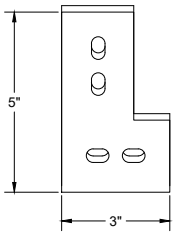
Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141EL90	No	1/4"	1"	0.5
CU141EL90KIT	Yes	1/4"	1"	0.8
CU141.5EL90	No	1/4"	1-1/2"	0.8
CU141.5EL90KIT	Yes	1/4"	1-1/2"	1
CU142EL90	No	1/4"	2"	1
CU142EL90KIT	Yes	1/4"	2"	1.3



90° Elbows

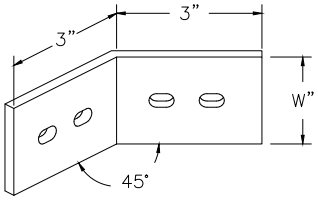
Part No.	Kit*	Thickness	Dims.	Approx. Each Wt. (lbs.)
CU1435EL90FL	No	1/4"	3" x 5"	1
CU1435EL90FLKIT	Yes	1/4"	3" x 5"	1.3

• Used for 1/4" x 2" bar stock.



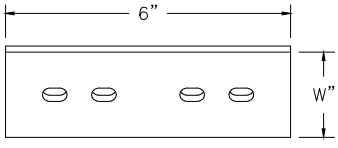
45° Elbows

Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141EL45	No	1/4"	1"	0.5
CU141EL45KIT	Yes	1/4"	1"	0.8
CU141.5EL45	No	1/4"	1-1/2"	0.8
CU141.5EL45KIT	Yes	1/4"	1-1/2"	1
CU142EL45	No	1/4"	2"	1
CU142EL45KIT	Yes	1/4"	2"	1.3

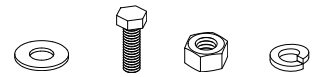


Splice Plates

Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141SPL	No	1/4"	1"	0.5
CU141SPLKIT	Yes	1/4"	1"	0.8
CU141.5SPL	No	1/4"	1-1/2"	0.8
CU141.5SPLKIT	Yes	1/4"	1-1/2"	1
CU142SPL	No	1/4"	2"	1
CU142SPLKIT	Yes	1/4"	2"	1.3

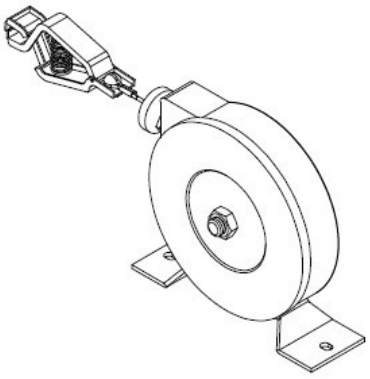


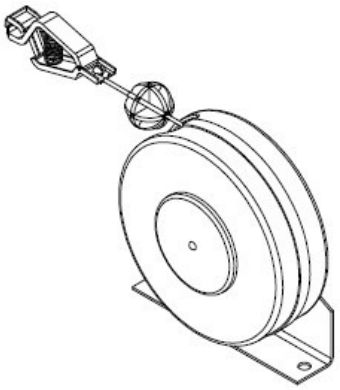
***Kit Includes:**
(1) Elbow or Splice Plate
(4) CS68S: 3/8”-16x1” SS hex head cap screw
(8) W6S: 3/8” SS flat washer
(4) LW6S: 3/8” SS lock washer
(4) N616S: 3/8”-16 SS hex nut



NOTES:
- Slotted hole size is 3/8" x 5/8" spaced 1" on center.
- Additional sizes available.

Static Ground Kits

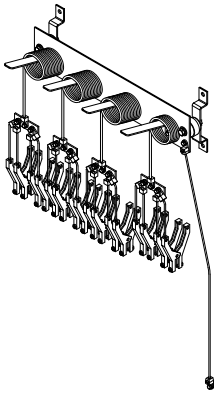


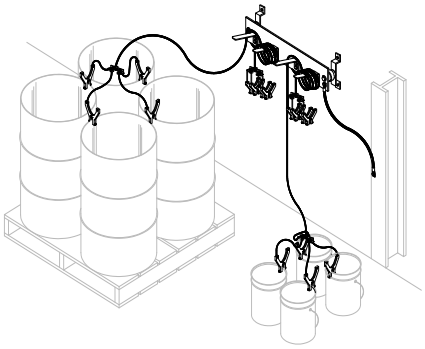


Static Ground Reel with Clip

Part No.	Cable Length	Approx. Each Wt. (lbs.)
SGR20	20'	4
SGR50	50'	6
SGR75	75'	8
SGR100	100'	10

- Static ground reel with retractable 3/32" diameter galvanized steel cable.
- Copper 100A grounding clip.
- Approximate 1" maximum clip opening.





Barrel Grounding Assembly

Part No.	Approx. Each Wt. (lbs.)
ABBOTTBG	30

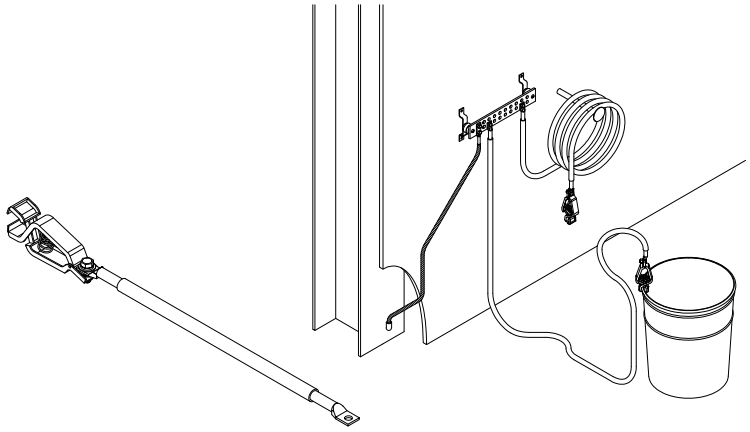
- Static ground assembly bonds up to 16 barrels or pails.
- Comes with 4 Quad Leads:
  - 3 leads with 10' coils.
  - 1 lead with 5' coil.
- Bars manufactured from 304 stainless steel.

Static Ground Kits

Pail Ground Strap

Part No.	Approx. Each Wt. (lbs.)
GJ2/0WC120BEMA	7

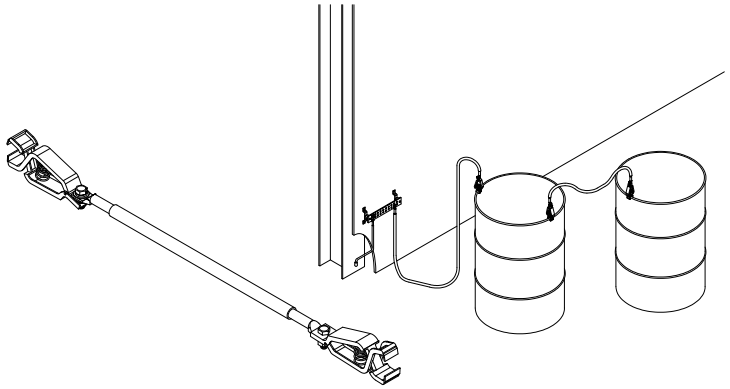
- 10' long, temporary static bond strap manufactured from 2/0 superflexible, insulated conductor.
- Comes with a 200 Amp copper ground clamp with 1-5/8" maximum jaw opening and a compression lug for 3/8" hardware.



Barrel Bond Strap

Part No.	Approx. Each Wt. (lbs.)
GJ4/0WC36CE	5.3

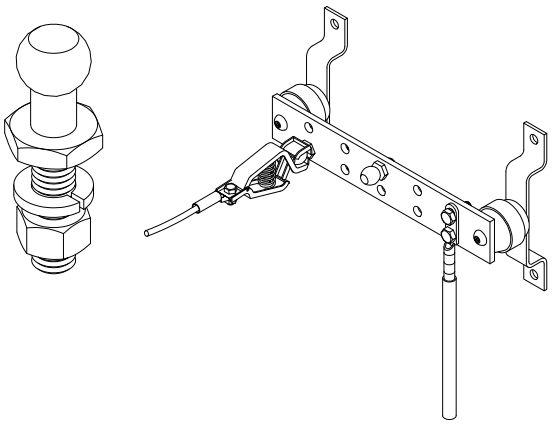
- 36" long, temporary static bond strap manufactured from 4/0 superflexible, insulated conductor.
- Comes with two 200 Amp copper ground clamps with 1-5/8" maximum jaw opening.



Brass Ground Stud

Part No.	Thread Length	Approx. Each Wt. (lbs.)
GRDSTD1.0	1"	0.2
GRDSTD1.25	1-1/4"	0.2

- Can be attached to ground bar or to steel frame of tank cars or trucks.
- 3/8-16 threaded stud with nut and lock washer.
- Used for static grounding.



Supplementary Bonding Grids

(also known as Signal Reference Grids)

&

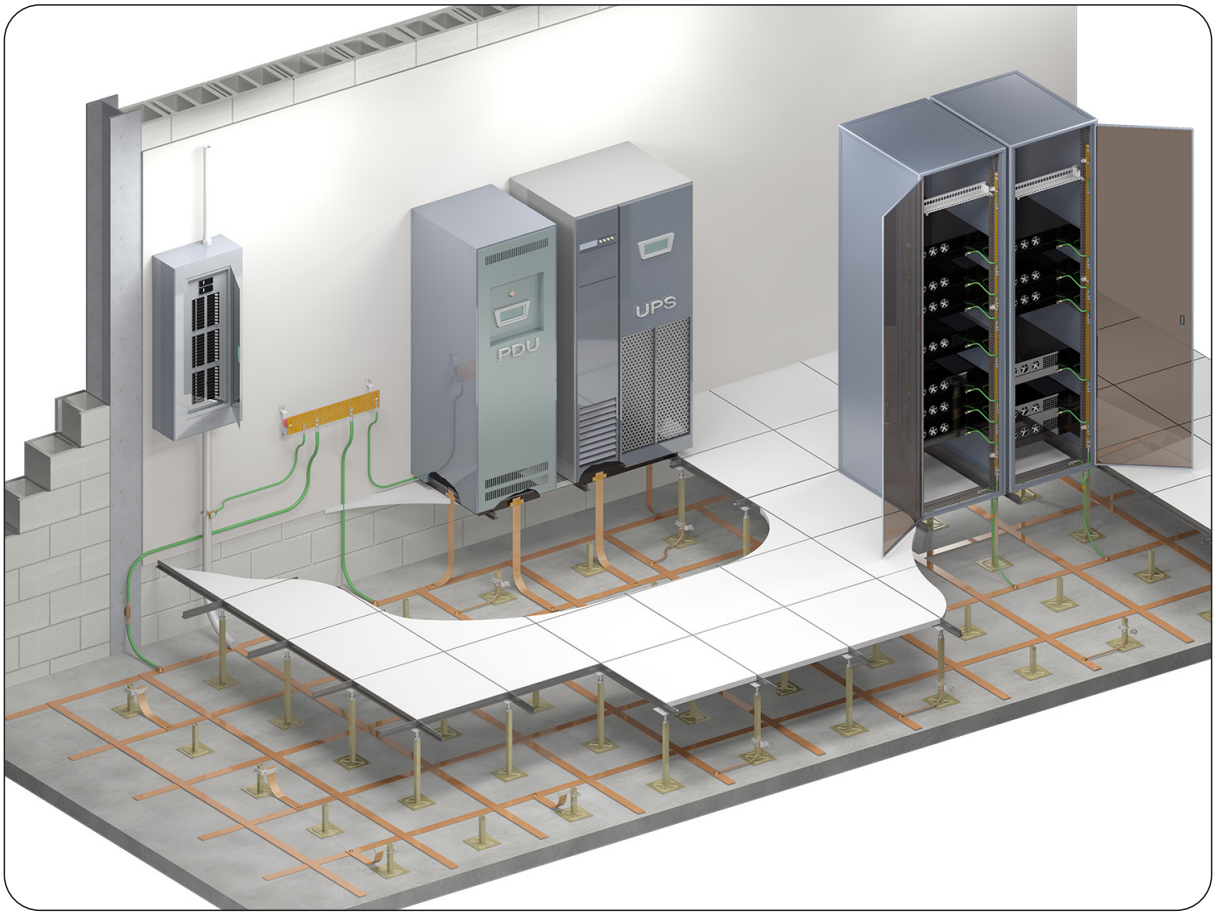
Prefabricated Copper Ground Mesh

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Supplementary Bonding Grids

Today's electronic environments require specialized grounding applications. Understanding higher frequency grounds, equipotential ground planes and supplementary bonding subsystems are imperative to protecting sophisticated equipment systems. Harger offers the knowledge and products required to protect these delicate systems. Signal Reference Grids (SRG) are also known as Supplementary Bonding Grids.



DEFINITIONS*:

- **Equipotential Plane:** A grid, sheet, mass, or masses of conducting material which, when bonded together, offers a negligible impedance to current flow (serves as signal reference subsystem for new facilities)
- **Higher Frequency Ground:** The interconnected metallic network (equipotential plane) intended to serve as a common reference for currents and voltages at frequencies above 30 kHz and in some cases above 300 kHz. Pulse and digital signals with rise and fall times of less than 1 microsecond are classified as higher frequency signals.
- **Signal Reference Subsystem:** A conductive sheet or cable network/mesh providing an equipotential reference for C-E equipments to minimize interference and noise.

*Military Handbook 419A

Flat Strip Supplementary Bonding Grids

Harger's Flat Strip Supplementary Bonding Grids are manufactured from 2" wide x 26 gauge soft copper strip. They are welded together forming a 2' x 2' pattern. Rolls of SRG range from 2' to 18' wide and the weight per roll is usually limited to a maximum of 250 pounds. The following page offers a design guide to help determine what part numbers are required for the flat strip system. Signal Reference Grids (SRG) are also known as Mesh-BN's, System Reference Potential Planes (SRPP) and Supplementary Bonding Grids.

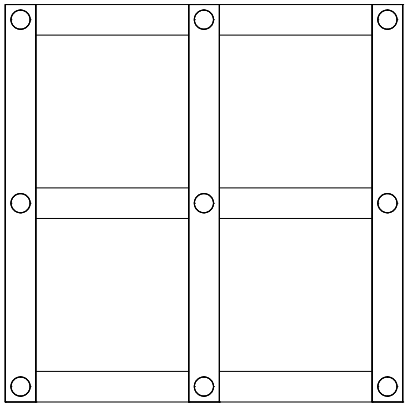
APPLICATION NOTES:

The grid lies directly on the subfloor that supports the raised floor. It may or may not be glued or fastened down. "Power and data cables lay on the grid. The advantage of this geometry is that, due to decreased open loop area, the coupling of radiated energy from far-field phenomena into the cables is minimized when they are very close to the copper strips that form the signal reference grid. The higher capacitance between the cables and the signal reference grid also increases the protected circuit's noise immunity to electric fields. Minimum spacing between the cables and the signal reference grid also reduces susceptibility to magnetic fields. Both of these are near-field effects.

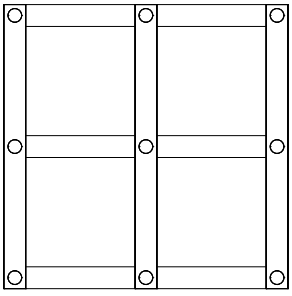
A possible disadvantage of this form of signal reference grid is the requirement for longer bonding straps as compared to the raised floor-based signal reference. Two bonding straps (of different lengths) to each piece of equipment substantially reduces the impedance of the strap."*

*IEEE Std 1100-2005

Listed 467



Supplementary Bonding Grid (SRG) Numbering System



Example

SRG 12 46 24

- SRG Mesh
- Width (in feet)
- Length (in feet)
- O.C. Spacing (in inches)

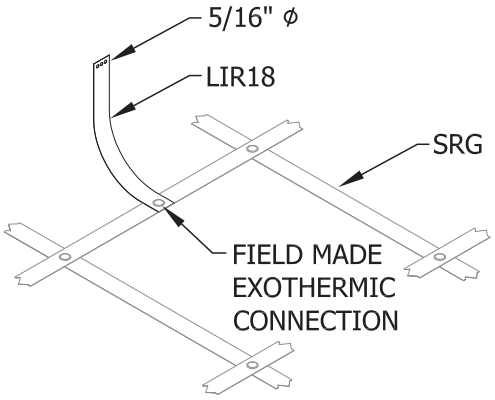
Standard SRG Sizes

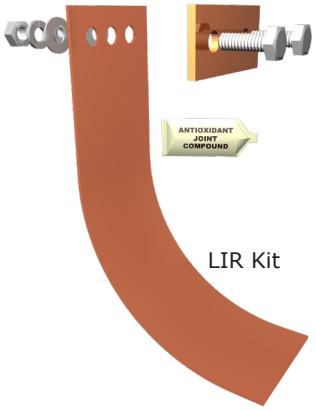
Part No.	Description	Approx. Each Wt. (lbs.)
SRG105024	10' x 50', 24" O.C. Spacing	90
SRG125024	12' x 50', 24" O.C. Spacing	98

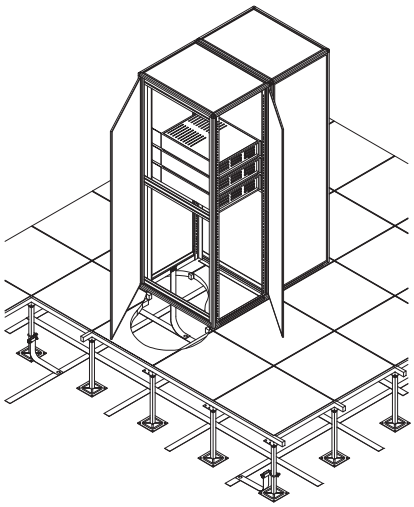
NOTES:

- 2" x .016" Copper Strip is used unless specified otherwise.
- Meets requirements of IEEE Std. 1100-2005.

Low Impedance Risers







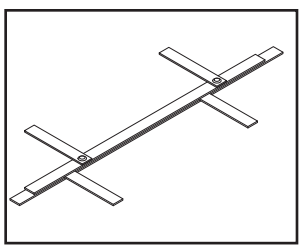
Part No.	Material	Length	Riser or Kit
LIR18	2" x .016" Flat Copper	18"	Riser
LIR18KIT	2" x .016" Flat Copper	18"	Kit
LIR24	2" x .016" Flat Copper	24"	Riser
LIR24KIT	2" x .016" Flat Copper	24"	Kit
LIR36	2" x .016" Flat Copper	36"	Riser
LIR36KIT	2" x .016" Flat Copper	36"	Kit
LIR72	2" x .016" Flat Copper	72"	Riser
LIR72KIT	2" x .016" Flat Copper	72"	Kit

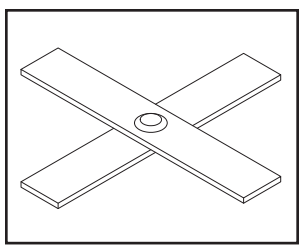
- Kit includes all necessary hardware.
- Use mold SRG2016K to weld LIR to SRG.

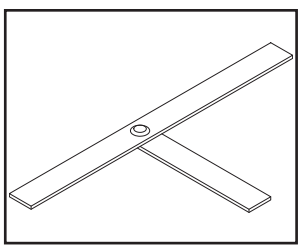
SRG to SRG Connections

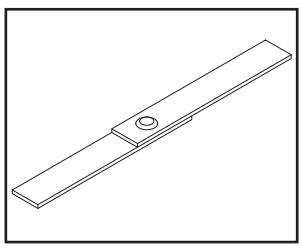
Mold Part No.	Flat Strip	Weld Metal		Required Handle
		UltraShot	NUWTUBE	
SRG2016K	2" x .016"	US32	NUWTUBE32	MH1

- The Ultraweld SRG mold and weld metal are used to exothermically weld adjacent SRG mats together in the field.
- The SRG mold can be used to make all required strip to strip connections.
- For low smoke requirements, a USSKIT (page 301) is required to convert standard Ultraweld molds into LOsmoke molds using UltraShot weld metal only.


Adjacent SRG Mats Welded Together


Cross


Tee


Splice

SRG Bonding

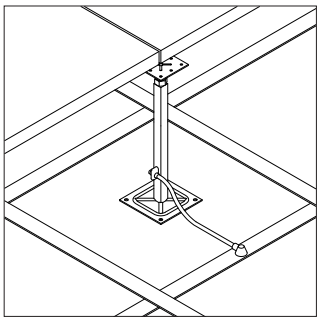
Pedestal Bonding to SRG

Connect pedestals per specification, typically every 6th in each direction, to the SRG using #6 AWG 7 strand copper cable. The cable should take the shortest path between the pedestal and the SRG. The length of the wire should not exceed 2 feet. The bond wire can either be exothermically welded to the pedestal (preferred method) or mechanically attached using a UL Listed Pedestal Ground Clamp (see page 90).

Exothermically Welded Pedestal Connections

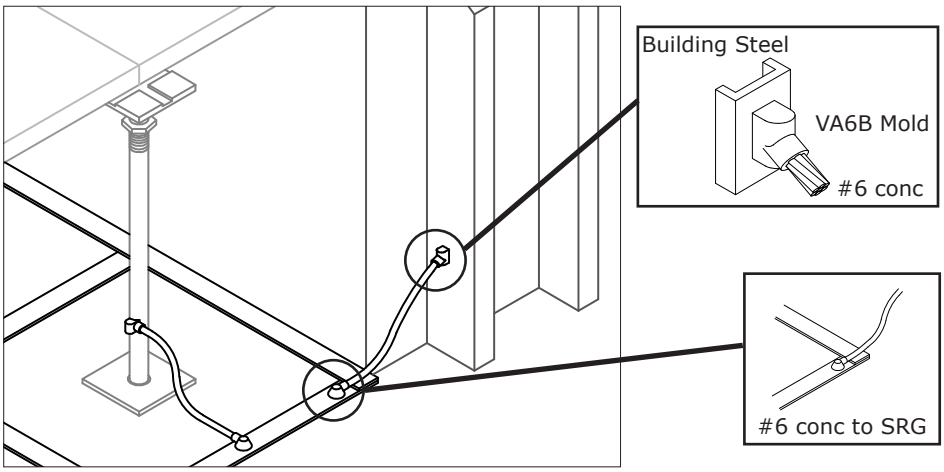
Mold Part No.	Connection	Weld Metal		Required Handle
		UltraShot	NUWTUBE	
VHO61SQB	#6 Conc. to 1" Sq. Pedestal	US25	NUWTUBE25	MH1
VHO41SQB	#4 Conc. to 1" Sq. Pedestal	US25	NUWTUBE25	MH1

- For Low smoke requirements, a USSKIT (page 301) is required to convert standard UltraShot molds into LOsmoke molds using UltraShot weld metal only.



Exothermic Connections for Bonding to Building Steel

All columns within and at perimeter of the computer room shall be bonded to the SRG using a concentric stranded copper conductor. #6 AWG 7 strand copper is the most common conductor used for this application. The cable should take the shortest path between the building steel and the Supplementary Bonding Grid.



Mold Part No.	Connection	Weld Metal		Required Handle
		UltraShot	NUWTUBE	
VA6B	#6 Conc. to Building Steel	US45	NUWTUBE45	MH1
VA4B	#4 Conc. to Building Steel	US45	NUWTUBE45	MH1
VA2B	#2 Conc. to Building Steel	US45	NUWTUBE45	MH1
BCF61.5016B	#6 Conc. to SRG	US25	NUWTUBE25	MH1
BCF41.5016B	#4 Conc. to SRG	US32	NUWTUBE32	MH1
BCF21.5016B	#2 Conc. to SRG	US32	NUWTUBE32	MH1

- For low smoke requirements, a USSKIT (page 301) is required to convert standard UltraShot molds into LOsmoke molds using Ultraweld weld metal only.

Round-wire Supplementary Bonding Grid

"A signal reference grid may also be economically fabricated from standard, bare round wire joined together via welding, brazing, compression, or a suitable grounding clamp arrangement at each of the crossing points. Typically, 6 AWG to 2 AWG copper wire is used." (IEEE Std 1100-2005)

A signal reference grid may also be economically fabricated from standard, bare round wire joined together via welding, brazing, compression, or a suitable grounding clamp arrangement at each of the crossing points. Typically, 6 AWG to 2 AWG copper wire is used.

Ground Pedestal Clamps & Bonding Clamps



Ground Pedestal Clamps for Flat Strip

Part No.	U-Bolt Type	Pedestal Size	Conductor Size	Approx. Each Wt. (lbs.)
GPC2FSSQ	Square	1"	2" Flat Strip	0.8
GPC2FSRD	Round	1"	2" Flat Strip	0.8

- Electro-tin plated copper.
- Includes stainless steel hardware.



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GPC - Square

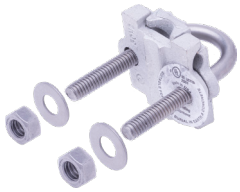
GPC - Round

Part No.	U-Bolt Type	Pedestal Size	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
GPC6SQ	Square	1" (1-1/8" OD)	6	0.7
GPC6RD	Round	1" (1-1/8" OD)	6	0.7
GPC4SQ	Square	1" (1-1/8" OD)	4	0.7
GPC4RD	Round	1" (1-1/8" OD)	4	0.7
GPC2SQ	Square	1" (1-1/8" OD)	2	0.7
GPC2RD	Round	1" (1-1/8" OD)	2	0.7
GPC2/0RD1.75	Round	1-1/8" - 1-3/4"	2/0 & 6	1.5

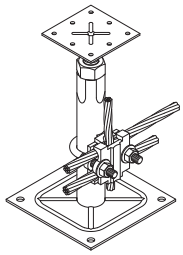
- Accommodates cross runs without adding an additional connector. Accommodates 4 conductors in total.
- Electro-tin plated copper.
- Includes stainless steel hardware.

NOTES:
- Additional sizes available. Contact factory for more information.

Ground Pedestal Clamps & Bonding Clamps



c UL us Listed 467
Listed 96

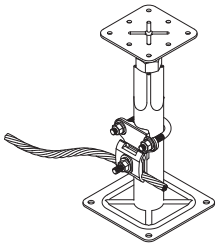


Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC.5/.75	Tinned Bronze	.5" - 1"	0.375" - 1"	0.5

- Electro-tin plated bronze includes stainless steel hardware.
- Accommodates 3 conductors from #6 AWG up to 4/0, with a maximum single conductor of 500 MCM or two conductors of 250 MCM.
- Fits both round and square pedestal legs up to 1" outside diameter.



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Listed 96

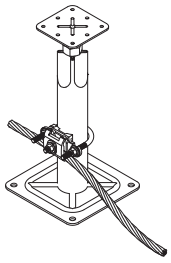


Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1/1.25	Tinned Bronze	1" - 1.625"	0.9375" - 1.7"	0.8

- Electro-tin plated bronze includes stainless steel hardware.
- Accommodates 2 conductors from #6 AWG up to 250 MCM.
- Fits round pedestal outside diameter range 0.9375" - 1.7".



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Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1.5/2	Tinned Bronze	1.5" - 2.375"	1.25" - 2.4"	0.8

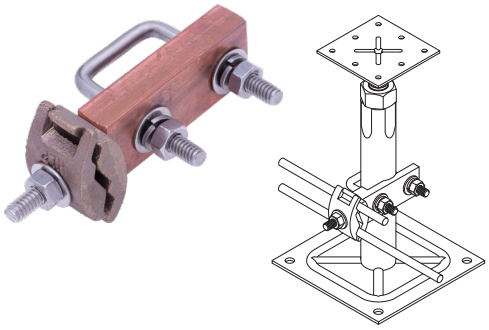
- Electro-tin plated bronze includes stainless steel hardware.
- Accommodates 2 conductors from #6 AWG up to 250 MCM.
- Fits round pedestal outside diameter range 1.25" - 2.4".

NOTES:
- Additional sizes available. Contact factory for more information.

Ground Pedestal Clamps & Bonding Clamps

Part No.	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
GP1MCI	6 Sol. thru 2/0 Str.	0.5
TGP1MCI	6 Sol. thru 2/0 Str.	0.5

- Heavy duty bronze clamp includes stainless steel hardware.
- Available electro-tin plated. When ordering, add prefix T to part number.
- Fits both round and square pedestal legs up to 1-1/8" outside diameter.



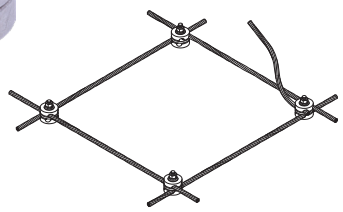
Computer Room Ground Clamps

Part No.	Conductor Size (AWG)	Approx. Each Wt. (lbs.)	UL Mark
CRGC6	6	0.2	Yes
CRGC4	4	0.3	No
CRGC2	2	0.4	Yes

- Used when welded connections are not feasible.
- Design allows clamps to form connections at most any angle.
- Specific uses include fabrication under an existing computer room floor.
- Electro-tin plated brass.



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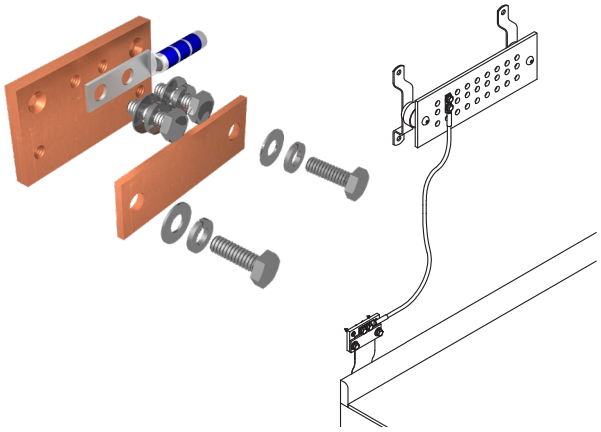


Static Floor Bonding Clamp Kit

Part No.	Approx. Each Wt. (lbs.)
SFBC3KIT	0.7

Kit Includes:
(4) CS44S: 1/4"-20 x 1/2" SS hex head cap screw
(4) LW4S: 1/4"-20 SS lock washer
(4) W4S: 1/4"-20 SS flat washer
(1) GECLB62A: #6 compression lug

- Manufactured from 110 copper alloy.
- Two piece design sandwiches firmly secures the ground strap.
- Wall mounting hardware, ground bar and conductor not included.
- Bonds static flooring system to the telecommunications bonding and grounding system.

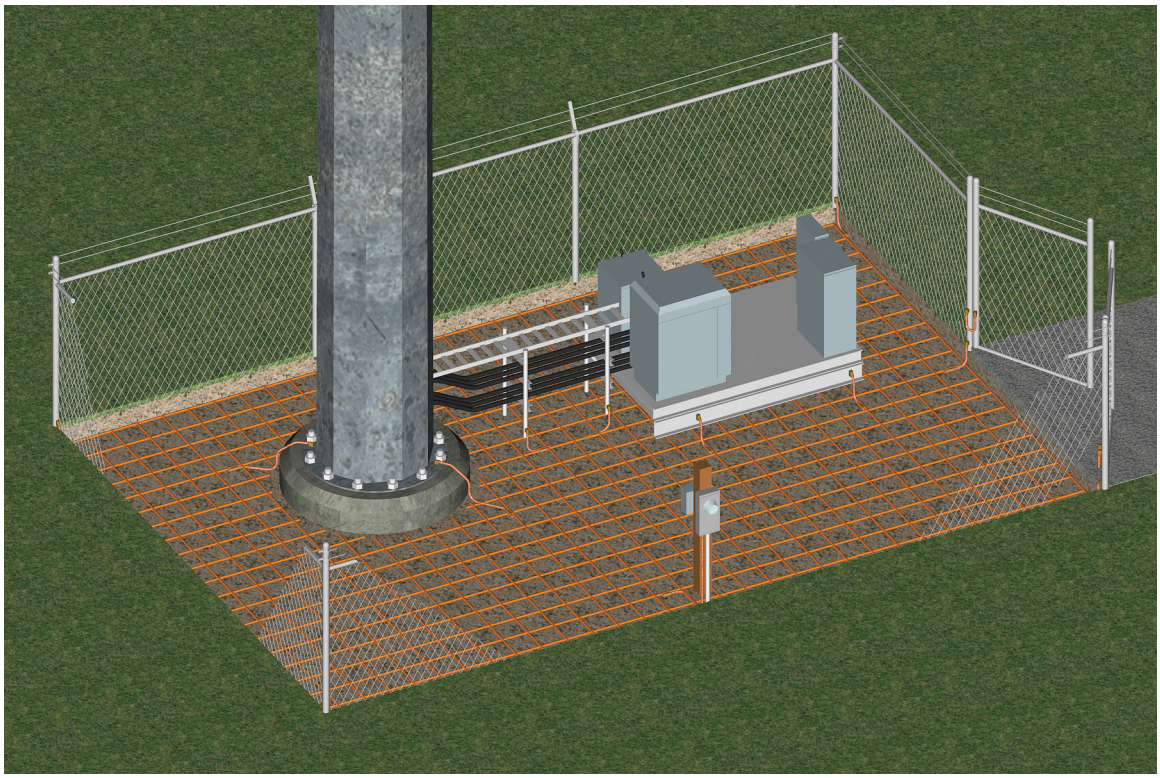


Prefabricated Copper Ground Mesh

Prefabricated wire mesh is a simple cost effective method of enhancing ground systems. Applications include improving the ground plane at telecommunications and radio transmitting/receiving facilities and reducing step and touch potentials at power plants and substations. Mesh is also used where ground rods are impossible to drive or are ineffective because of soil conditions.

Wire mesh is manufactured from solid copper or copper clad steel wire, ranging from #10 AWG to #4 AWG. Normal spacing between conductors is 4", 6", 8", 12", 24" and 48". All joints are silver brazed to enhance electrical continuity, corrosion resistance and strength.

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Standard Mat Sizes

Part No.	Width (ft.)	Length (ft.)	Conductor Size/Type (AWG)	Conductor Spacing (in.)	Approx. Each Wt. (lbs.)
GM125066	12	50	6 Solid Copper	6	214
GM1250612	12	50	6 Solid Copper	12	117
GM1250624	12	50	6 Solid Copper	24	69

- Maximum mesh width is 20 ft.
- Other sizes available. Contact factory for more information.

Copper Ground Mesh Numbering System

GM 12 46 6 24 OE1

- GM — Ground Mesh
- 12 — Width (ft.)
- 46 — Length (ft.)
- 6 — Conductor Size/Type
- 24 — O.C. Spacing (in.)
- OE1 — End Type

Standard Mesh Configurations

Wire Size: #4, #6, #8, #10 AWG Solid Conductor

Wire Type: Pure copper or copper clad (30% and 40% conductivity)

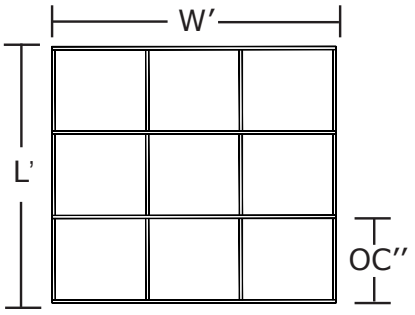
Mesh Size: 4" square through 48" square in 4" and 6" increments

Conductors

Part No.	Type
4	Solid Copper
6CW4D	Copper Clad 40% Conductivity
6	Solid Copper
6CW3D	Copper Clad 30% Conductivity
8	Solid Copper
8CW3D	Copper Clad 30% Conductivity
10	Solid Copper

Overhang/Overlapping Ends

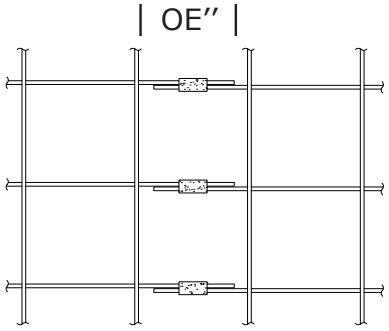
End Type	Description
OE1	1 End
OE2	2 Ends



No Overhang

Harger prefabricated wire mesh can be supplied with no overhang, overlapping ends or butt splice ends.

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Overlapping ends

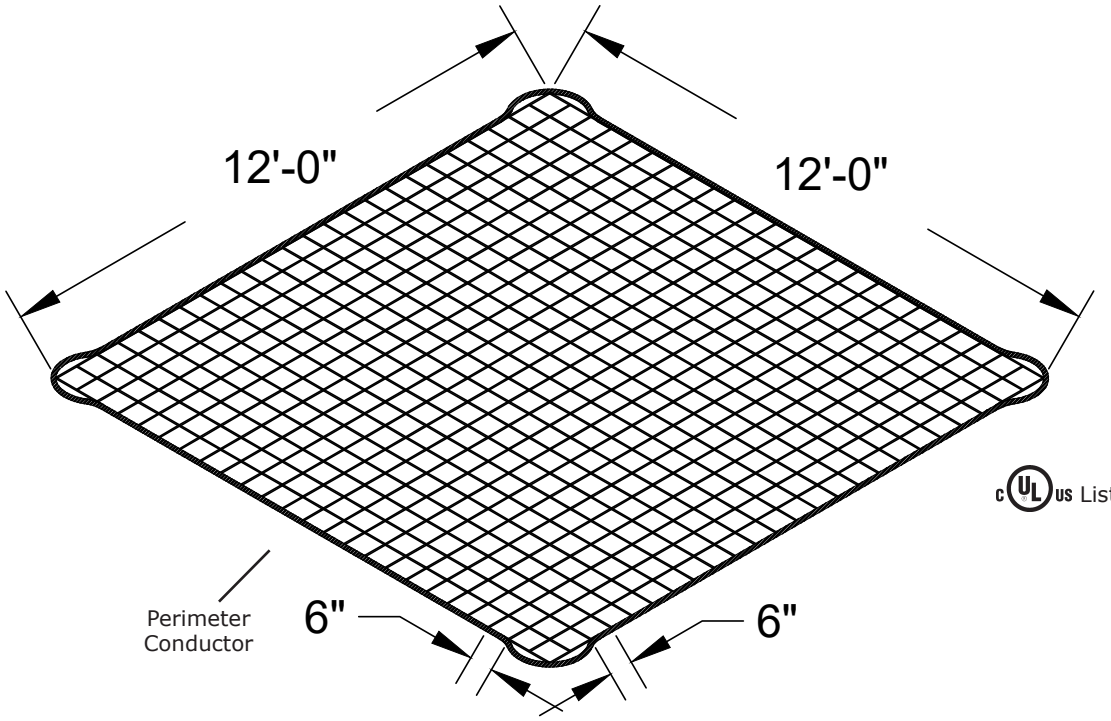
The overlapping end configuration is designed to allow for side by side connections of adjoining mats. This type of connection provides an efficient method of joining two mesh sections. Adding 2" to one half the conductor spacing provides the overlapping ends. For example, if the mesh size is 6" square, the overlapping end length is 5".

OVERHANG NOT INCLUDED IN TOTAL LENGTH/WIDTH

NOTES:

- Overlapping ends are equal to 1/2 the O.C. spacing plus 2" unless specified otherwise.
- Maximum mesh width is 20 ft.
- To connect Mesh to Ground, use PT connection type. See page 255.
- To connect Mesh to Mesh, use PS connection type. See page 261.

Copper Ground Mesh



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Part No.	Perimeter Conductor (AWG)	Approx. Each Wt. (lbs.)
GM121266	None	50
GM121266P2T	2T	60
GM121266SPR12	4/0-19T	81

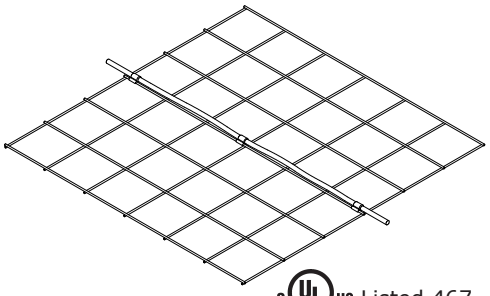
- 12' x 12' prefabricated wire grounding mesh with 6" squares made from #6 AWG solid copper.
- Available with a tinned perimeter conductor exothermically welded to mesh.
- Mesh is silver brazed at all crossovers using a 15% or 35% silver brazing alloy and a non-corrosive flux.
- Maximum mesh width is 20 ft.

APPLICATION NOTES:

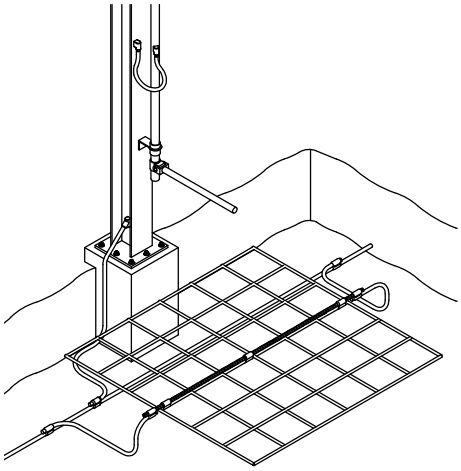
- For enhancing external grounding systems at radio, paging, cellular, etc. transmitting/receiving facilities.
- If strategically placed, mesh can be used as a safety adjunct to reduce dangerous step and touch potentials.
- Perimeter conductor makes for convenient attachment to ground conductors.

Personnel Safety Mats

Harger personnel safety mats are designed to protect against "touch potentials" under fault conditions. Listed below are standard mat configurations, however mats can be customized by utilizing the personnel safety mat numbering system. The following example is a safety mat that is 6' wide x 6' long made up of #6 solid copper conductor. Conductors are spaced every 12" and the mat has a 1/0 AWG solid center wire.



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Personnel Safety Mat Numbering System

PSM 6 6 6 12 C1/0S

- PSM — Personnel Safety Mat
- 6 — Width (ft.)
- 6 — Length (ft.)
- 6 — Conductor Size/Type
- 12 — Conductor Spacing (in.) (Mesh Size)
- C1/0S — Optional Center Wire

Standard Mat Configurations

Mat Size:	4' x 4', 4' x 6', 6' x 6', 6' x 8'
Wire Size:	#4, #6, #8 AWG Solid Conductor
Wire Type:	Pure copper or copper clad steel (30% and 40% conductivity)
Mesh Size:	2" square through 12" square in 2" increments
Center Wire:	Optional - See available Solid Copper Conductors on page 16. Comes with standard 6” overhang on both sides of the mat.

Conductors

Part No.	Type
4	Solid Copper
6CW4D	Copper Clad 40% Conductivity
6	Solid Copper
6CW3D	Copper Clad 30% Conductivity
8	Solid Copper
8CW3D	Copper Clad 30% Conductivity

Standard Mat Sizes

Part No.	Width (ft.)	Length (ft.)	Conductor Size/Type (AWG)	Conductor Spacing (in.)	Optional Center Wire	Approx. Each Wt. (lbs.)
PSM4666C1/0S	4	6	6 Solid Copper	6	1/0 Sol.	11
PSM4644C2/0	4	6	4 Solid Copper	4	2/0	23
PSM61066C4/0S	6	10	6 Solid Copper	6	4/0 Sol.	26

NOTES:
- To connect mat to ground, use PT connection type. See page 255.
- Maximum mat width is 20 ft.

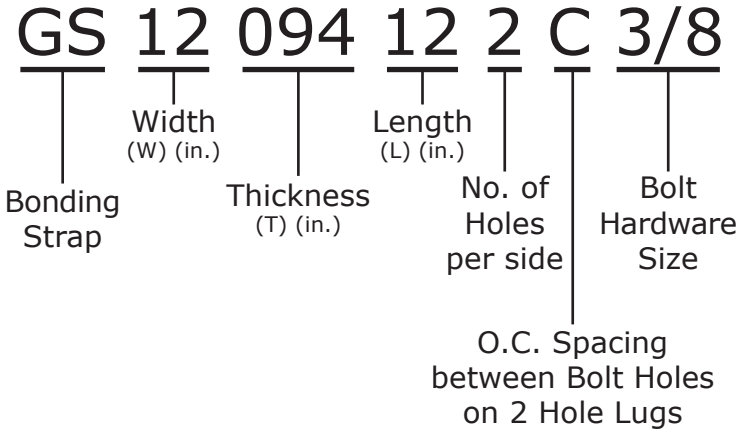
Bonding Straps/Bonding Jumpers

Index

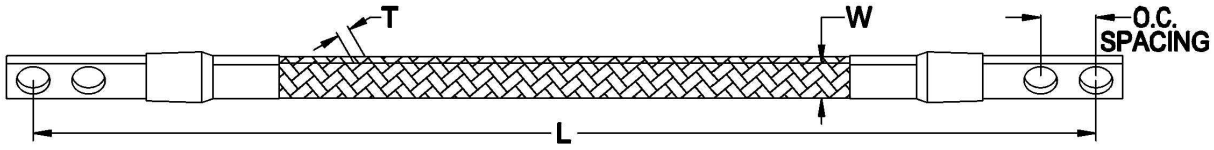
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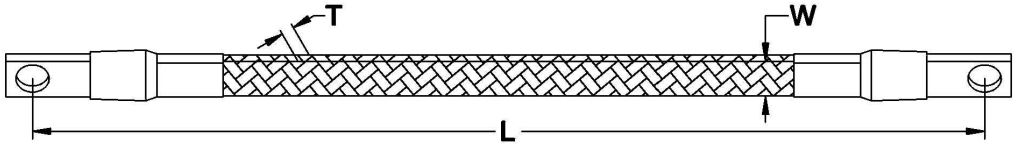
Bonding Strap Numbering System

Bonding straps are constructed from flexible tinned copper flat braid. Available with one or two hole compression lugs. Harger offers a variety of lengths and styles. Customizing your own straps is simple with Harger's bonding strap numbering system. To design your own custom bonding strap simply follow the steps outlined below. The following example is a 1/2" wide, .094" thick, 12" long bonding strap using 2 hole compression lugs with 1" O.C. spacing between 3/8" bolt holes.

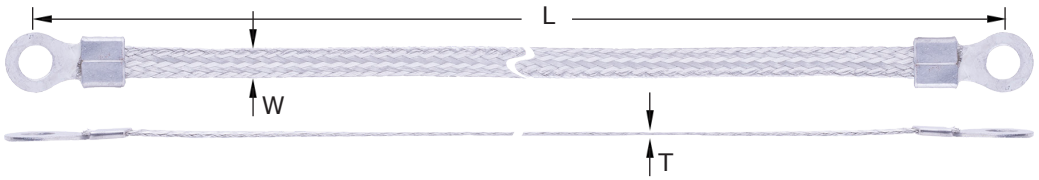


1. Width (W) of braid strap
2. Thickness (T) of braid strap
3. Length (L) of braid strap (O.C. from lug hole)
4. Specifies one or two holes per side of strap
5. O.C. Spacing between Bolt Hole on 2 Hole Lugs
   A=5/8", B=3/4", C=1", D=1-3/4"
6. Bolt hole size



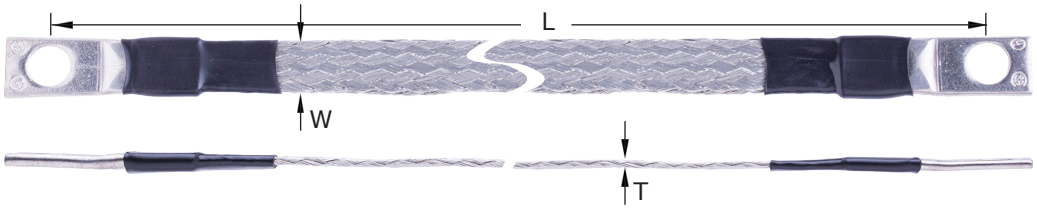


One Hole Tinned Flat Braid Copper Bonding Straps

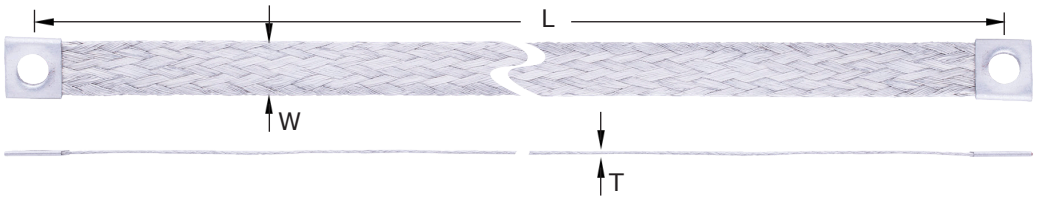


Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GS140306R13/8	1/4"	.030"	14	6"	1	3/8"	0.5
GS1403012R13/8	1/4"	.030"	14	12"	1	3/8"	0.5
GS1403024R13/8	1/4"	.030"	14	24"	1	3/8"	0.5

- "R" indicates Ring Lug.



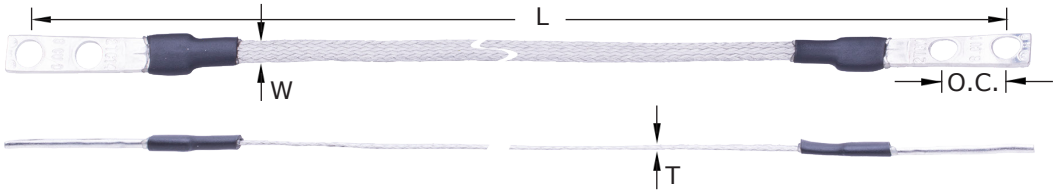
Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GS12094613/8	1/2"	.094"	6	6"	1	3/8"	0.5
GS120941213/8	1/2"	.094"	6	12"	1	3/8"	0.5
GS120942413/8	1/2"	.094"	6	24"	1	3/8"	0.5



Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GS5806215.188PTMW	5/8"	.062	5	15.2"	1	7/16"	0.3

APPLICATION NOTES:
- Dimensions are nominal sizes.
- Additional sizes available. Contact factory for more information.

Two Hole Tinned Flat Braid Copper Bonding Straps



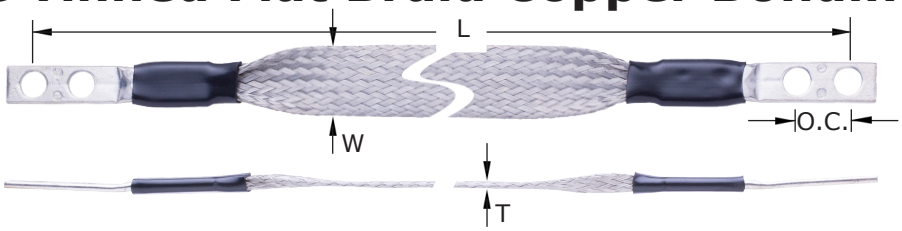
Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
GS14030102A1/4	1/4"	.030"	14	10"	2	5/8"	1/4"	0.5
GS14030162A1/4	1/4"	.030"	14	16"	2	5/8"	1/4"	0.5
GS14030242A1/4	1/4"	.030"	14	24"	2	5/8"	1/4"	0.5

Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
GS12094122A1/4	1/2"	.094"	6	12"	2	5/8"	1/4"	0.5
GS12094122C3/8	1/2"	.094"	6	12"	2	1"	3/8"	0.5
GS12094182A1/4	1/2"	.094"	6	18"	2	5/8"	1/4"	0.5
GS12094182C3/8	1/2"	.094"	6	18"	2	1"	3/8"	0.5
GS12094242A1/4	1/2"	.094"	6	24"	2	5/8"	1/4"	0.5
GS12094242C3/8	1/2"	.094"	6	24"	2	1"	3/8"	0.5

Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
GS34062122A1/4	3/4"	.062"	6	12"	2	5/8"	1/4"	0.5
GS34062122C3/8	3/4"	.062"	6	12"	2	1"	3/8"	0.5
GS34062182A1/4	3/4"	.062"	6	18"	2	5/8"	1/4"	0.5
GS34062182C3/8	3/4"	.062"	6	18"	2	1"	3/8"	0.5
GS34062242A1/4	3/4"	.062"	6	24"	2	5/8"	1/4"	0.5
GS34062242C3/8	3/4"	.062"	6	24"	2	1"	3/8"	0.5
GS34062302A1/4	3/4"	.062"	6	30"	2	5/8"	1/4"	0.5
GS34062302C3/8	3/4"	.062"	6	30"	2	1"	3/8"	0.5

APPLICATION NOTES:
- Dimensions are nominal sizes.
- Additional sizes available. Contact factory for more information.

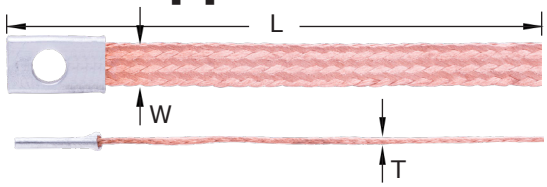
Two Hole Tinned Flat Braid Copper Bonding Straps



Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
GS1062122A1/4	1"	.062"	4	12"	2	5/8"	1/4"	0.5
GS1062122C3/8	1"	.062"	4	12"	2	1"	3/8"	0.5
GS1062182A1/4	1"	.062"	4	18"	2	5/8"	1/4"	0.5
GS1062182C3/8	1"	.062"	4	18"	2	1"	3/8"	0.5
GS1062242A1/4	1"	.062"	4	24"	2	5/8"	1/4"	0.5
GS1062242C3/8	1"	.062"	4	24"	2	1"	3/8"	0.5

- Dimensions are nominal sizes.
- Additional sizes available. Contact factory for more information.

One Hole Bare Copper Braid Bonding Strap



Part No.	Braid Width	Braid Thickness	Gauge Equivalent (AWG)	Length	No. of Holes	Hardware Size	Approx. Each Wt. (lbs.)
GS58101TIE	7/16"	.070"	7	10"	1	7/16"	0.3

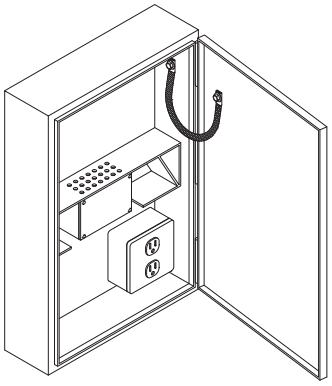
One Hole Bare Copper Braid Bonding Strap Kit

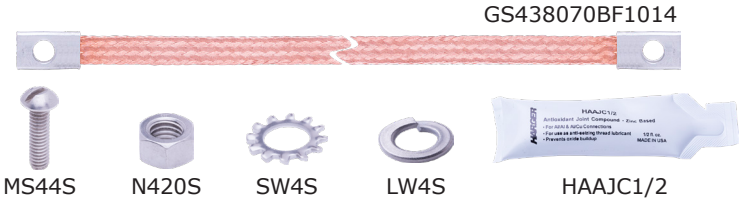
Part No.	Braid Width	Braid Thickness	Length	No. of Holes	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
GS438070BF1014KIT	7/16"	.070"	10"	1	10-1/8"	1/4"	0.3

- Additional sizes available. Contact factory for more information.

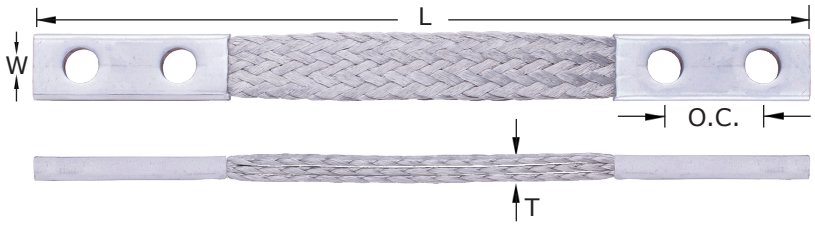
Kit Includes:

(1) GS438070BF1014: copper flat braid bonding strap
(1) HAAJC1/2: aluminum antioxidant 1/2 oz. tube
(2) N420S: 1/4"-20 stainless steel hex nut
(2) MS44S: 1/4"-20 x 1/2" stainless steel machine screw
(2) LW4S: 1/4" stainless steel split lock washer
(2) SW4S: 1/4" star lock washer





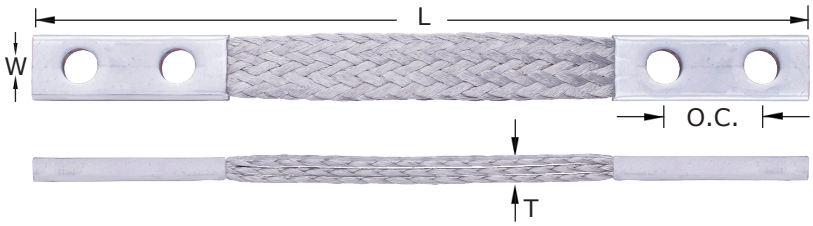
Bonding/Grounding Straps



Part No.	Amps	Number of Braids	"W" Terminal Width	"L" Terminal Length End to End	Hole O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
BGS37C12D2D	470	3	1"	12"	1-3/4"	1/2"	1
BGS37C12E2C	470	3	1"	12"	1-1/4"	3/8"	1
BGS39A12D2D	190	1	1"	12"	1-3/4"	1/2"	1
BGS39A12E2C	190	1	1"	12"	1-1/4"	3/8"	1
BGS39A18D2D	190	1	1"	18"	1-3/4"	1/2"	1
BGS39A18E2C	190	1	1"	18"	1-1/4"	3/8"	1
BGS39A24D2D	190	1	1"	24"	1-3/4"	1/2"	1
BGS39A24E2C	190	1	1"	24"	1-1/4"	3/8"	1
BGS39B12D2D	360	2	1"	12"	1-3/4"	1/2"	1
BGS39B12E2C	360	2	1"	12"	1-1/4"	3/8"	1
BGS39B12F2C	360	2	1"	12"	1-1/2"	3/8"	1
BGS39B18D2D	360	2	1"	18"	1-3/4"	1/2"	2
BGS39B18F2C	360	2	1"	18"	1-1/2"	3/8"	2
BGS39B24D2D	360	2	1"	24"	1-3/4"	1/2"	2
BGS39B24F2C	360	2	1"	24"	1-1/2"	3/8"	2
BGS39D12D2D	600	4	1"	12"	1-3/4"	1/2"	2
BGS39D12E2C	600	4	1"	12"	1-1/4"	3/8"	2
BGS49C12D2D	515	3	1-3/8"	12"	1-3/4"	1/2"	2
BGS49C12F2C	515	3	1-3/8"	12"	1-1/2"	3/8"	2
BGS51B12D2D	530	2	2"	12"	1-3/4"	1/2"	2
BGS51B12F2C	530	2	2"	12"	1-1/2"	3/8"	2
BGS51C12D2D	600	3	2"	12"	1-3/4"	1/2"	2
BGS51C12F2C	600	3	2"	12"	1-1/2"	3/8"	2

- Terminal ends come tinned as standard. Bare, silver, nickel are available.
- Braid comes tinned as standard.
- Additional sizes available. Contact factory for more information.

Bonding/Grounding Straps

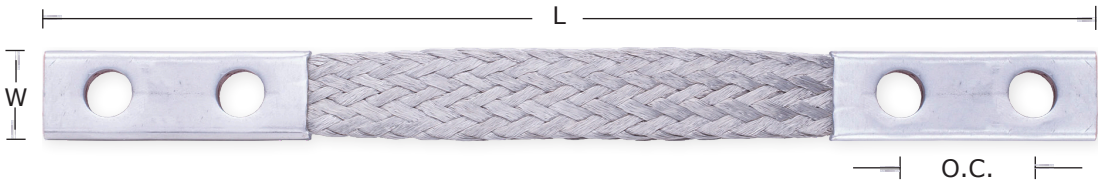


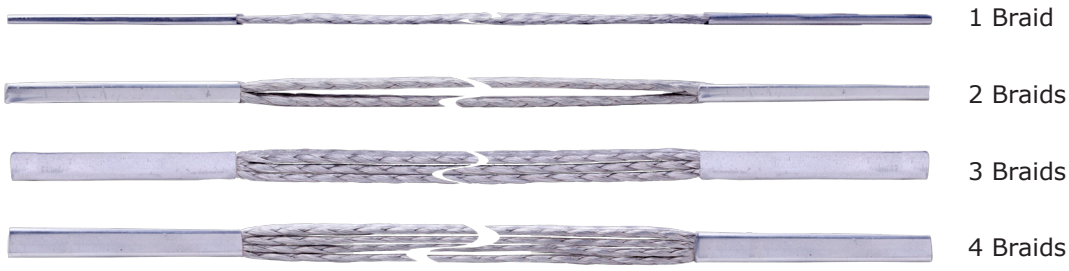
Part No.	Amps	Number of Braids	"W" Terminal Width	"L" Terminal Length End to End	Hole O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)
BGS52B12D2D	530	2	2"	12"	1-3/4"	1/2"	2
BGS52B12F2C	530	2	2"	12"	1-1/2"	3/8"	2
BGS52B18D2D	530	2	2"	18"	1-3/4"	1/2"	3
BGS52B18F2C	530	2	2"	18"	1-1/2"	3/8"	3
BGS52B24D2D	530	2	2"	24"	1-3/4"	1/2"	3
BGS52B24F2C	530	2	2"	24"	1-1/2"	3/8"	3
BGS52D12D2D	530	4	2"	12"	1-3/4"	1/2"	3
BGS52D12F2C	530	4	2"	12"	1-1/2"	3/8"	3
BGS53B12D2D	520	2	2"	12"	1-3/4"	1/2"	2
BGS53C12D2D	700	3	2"	12"	1-3/4"	1/2"	3
BGS53C12F2C	700	3	2"	12"	1-1/2"	3/8"	3
BGS53D12D2D	800	4	2"	12"	1-3/4"	1/2"	3
BGS53D12F2C	800	4	2"	12"	1-1/2"	3/8"	3
BGS56D12D2D	1000	4	2-1/2"	12"	1-3/4"	1/2"	5
BGS61A12D2D	415	1	1-1/2"	12"	1-3/4"	1/2"	2
BGS61A12F2C	415	1	1-1/2"	12"	1-1/2"	3/8"	2
BGS61A18D2D	415	1	1-1/2"	18"	1-3/4"	1/2"	3
BGS61A18F2C	415	1	1-1/2"	18"	1-1/2"	3/8"	3
BGS61A24D2D	415	1	1-1/2"	24"	1-3/4"	1/2"	3
BGS61A24F2C	415	1	1-1/2"	24"	1-1/2"	3/8"	3

- Terminal ends come tinned as standard. Bare, silver, nickel are available.
- Braid comes tinned as standard.
- Additional sizes available. Contact factory for more information.

Custom Bonding Strap Design Sheet

Fill out your requirements, submit the sheet to our factory and we will produce your custom bonding strap in a timely fashion.





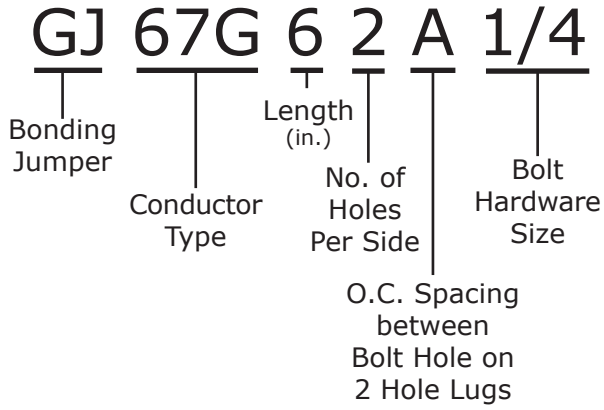
1. Braid Type:
    a. Bare Copper _____
    b. Tinned Copper _____
    c. Stainless Steel _____

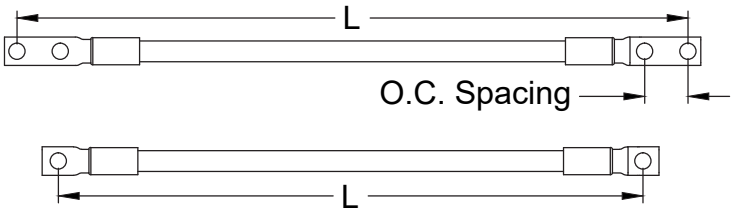
2. Lug End Configuration:
    a. Width _____
    b. Formed on One End _____
    c. Formed on Both Ends _____
    d. Number of Holes in Each End _____
        i. Spacing of Holes _____
        ii. Hole Size _____

3. Strap Design:
    a. Length _____
    b. Number of Rows (horizontal) _____
    c. Number of Braids (vertical) _____
    d. Min. Circular Mils per Strap _____

Bonding Jumper Numbering System

Bonding jumpers are constructed from round conductors, insulated or bare. Available with one or two hole compression lugs. Harger offers a variety of lengths and styles. Customizing your own jumper is simple with Harger's bonding jumper numbering system. To design your own custom bonding jumper simply follow the steps outlined below. The following example is a #6-7 AWG green conductor, 6" long with 2 hole compression lugs that have 5/8" O.C. spacing between 1/4" bolt holes.





1. Conductor type
2. Length of bonding jumper
3. Specifies one or two holes per side of jumper
4. O.C. Spacing between Bolt Hole on 2 Hole Lugs
   A=5/8", B=3/4", C=1", D=1-3/4"
5. Bolt hardware size

One Hole Bonding Jumpers & Kits



c UL us Listed 467

Part No.	Kit	Conductor Type	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GJ67G1211/4	No	67G	12"	1	1/4"	0.3
GJ67G1211/4KIT	Yes	67G	12"	1	1/4"	1.3
GJ67G1811/4	No	67G	18"	1	1/4"	0.3
GJ67G1811/4KIT	Yes	67G	18"	1	1/4"	1.3
GJ67G2411/4	No	67G	24"	1	1/4"	0.3
GJ67G2411/4KIT	Yes	67G	24"	1	1/4"	1.3

- #6 AWG x 7 Strand Green THW-2 insulation.
- Additional sizes and types available. Contact factory for more information.

Kit Includes:

(2) CS46S: 1/4"-20 x 3/4" HHCS 18-8 SS
(2) N420S: 1/4" Hex Nut 18-8 SS
(2) LW4S: 1/4" Lock Washer 18-8 SS



Two Hole Insulated Bonding Jumpers & Kits



c UL us Listed 467

Part No.	Kit	Conductor Type	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GJ67G82A1/4	No	67G	8"	2	1/4"	0.2
GJ67G82A1/4KIT	Yes	67G	8"	2	1/4"	0.2
GJ67G102A1/4	No	67G	10"	2	1/4"	0.3
GJ67G102A1/4KIT	Yes	67G	10"	2	1/4"	0.3
GJ67G122A1/4	No	67G	12"	2	1/4"	0.3
GJ67G122A1/4KIT	Yes	67G	12"	2	1/4"	0.3

- #6 AWG x 7 Strand Green THW-2 insulation.
- Additional sizes and types available. Contact factory for more information.

Kit Includes:

(2) CS46S: 1/4"-20 x 3/4" HHCS 18-8 SS
(4) N420S: 1/4" Hex Nut 18-8 SS
(2) BLW4S: Bonding Lug Washer 1/4" x 5/8" On Center Spacing



CS46S N420S BLW4S

Tinned Flexible Ring Terminal Jumper



c UL us Listed 467

Part No.	Conductor Type	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)
GJ6TCR12R11/4	6T	12	1	1/4"	0.2
GJ6TCR12R15/16	6T	12	1	5/16"	0.2
GJ6TCR18R11/4	6T	18	1	1/4"	0.2
GJ6TCR18R15/16	6T	18	1	5/16"	0.2
GJ6TCR24R1/4	6T	24	1	1/4"	0.3
GJ6TCR24R5/16	6T	24	1	5/16"	0.3

- #6 Tinned copper rope lay for flexibility.
- Single hole terminals for ¼" mounting hardware.

Compression Lugs, Connectors & Tools

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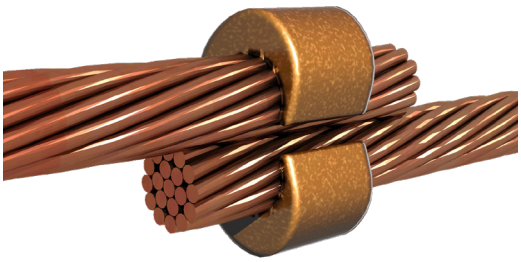
Compression Grounding Series CGET





Intertek
5013940
Conf. to UL Std 467

DB DIRECT BURIAL

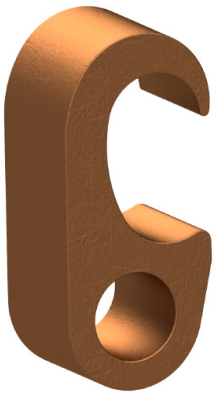


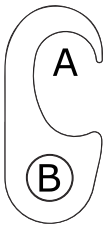
Part No.	Cable to Cable or Cable to Ground Rod ①		Installation Data		Approx. Each Wt. (lbs.)
	Run (A)	Tap (B)	Die Index	No. of Crimps	
CGET26	#6 Sol. - #2 Str. , 1/4” Rod	#6 Sol. - #2 Str.	U-C	1	0.1
CGET2/06	#1 Str. - 2/0 Str. , 3/8” Rod	#6 Sol. - #2 Str.	U-0	1	0.2
CGET2/01	#1 Str. - 2/0 Str. , 3/8” Rod	#1 Str. - 2/0 Str.		1	0.2
CGET2506	3/0 Str. - 250 MCM, 1/2” - 5/8” Rod	#6 Sol. - 2/0 Str.	U997	1	0.3
CGET2503/0	3/0 Str. - 250 MCM, 1/2” - 5/8” Rod	3/0 Str. - 250 MCM		1	0.3
CGET5006	300 MCM - 500 MCM, 3/4” Rod	#6 Sol. - 2/0 Str.	U1011	2	0.5
CGET5003/0	300 MCM - 500 MCM	3/0 Str. - 250 MCM		2	0.5
CGET500300	300 MCM - 500 MCM	300 MCM - 500 MCM		3	0.7

Notes:
① For ground rod to wire applications, ground rod must be precrimped, see Precrimp Die Chart.
- Available in tinned versions. Add prefix "T".
- Available with factory applied antioxidant. Add suffix “-A”.
- A 12-ton tool is required for these connections.

Precrimp Die Chart	
Ground Rod Diameter	Dies
1/2”	U2CABT
5/8”	U2CABT
3/4”	U2CABT

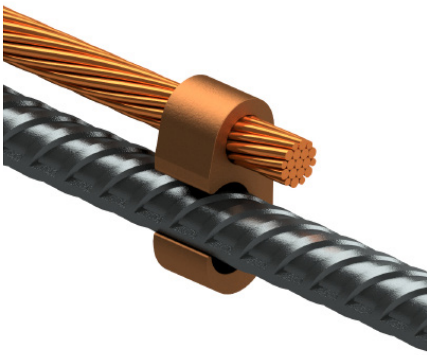
Compression Grounding Series CGCR





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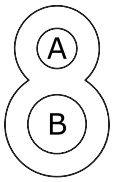
Part No.	Cable to Cable or Cable to Ground Rod ①		Cable to Reinforcing Steel ②		Installation Data		Approx. Each Wt. (lbs.)
	Run (A)	Tap (B)	Run (A)	Tap (B)	Die Index	No. of Crimps	
CGCR2504	1/0 Str. - 250 MCM 1/2" - 5/8" Rod	#4 Sol. - #2 Str.	#3 - #4 Reinforcing Steel	#2 Str.	U997	1	0.3
CGCR2501/0		1/0 Str. - 2/0 Str.		1/0 Str. - 2/0 Str.		1	0.3
CGCR2503/0③		3/0 Str. - 250 MCM		3/0 Str. - 250 MCM		1	0.3
CGCR5004	250 MCM - 500 MCM 5/8" - 3/4" Rod	#4 Sol. - #2 Str.	#5 - #6 Reinforcing Steel	#4 Sol. - #2 Str.	U998	1	0.4
CGCR5001/0		1/0 Str. - 2/0 Str.		1/0 Str. - 2/0 Str.		1	0.4
CGCR5003/0		3/0 Str. - 250 MCM		3/0 Str. - 250 MCM		1	0.4

Notes:
① Ground Rods must be precrimped. See Precrimp Die Chart.
② Clean rust and protective coatings from reinforcing steel prior to installation to provide proper ground connection. Precrimping is not required.
③ When using 3/0 in tap, minimum run conductor must be 2/0 Str.
- When attaching connector to ground rod, ground rod must be precrimped with appropriate precrimping die.
- Available in tinned versions. Add prefix "T".
- Available with factory applied antioxidant. Add suffix "-A".
- A 12-ton tool is required for these connections.

Precrimp Die Chart	
Ground Rod Diameter	Dies
1/2"	U2CABT
5/8"	U2CABT
3/4"	U2CABT

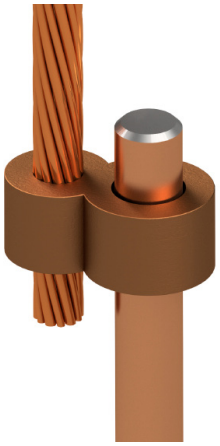
Compression Grounding Series CGCRFE





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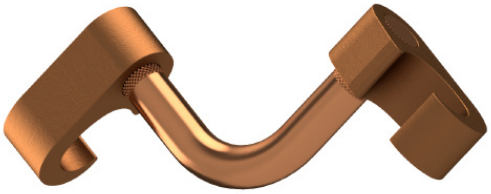


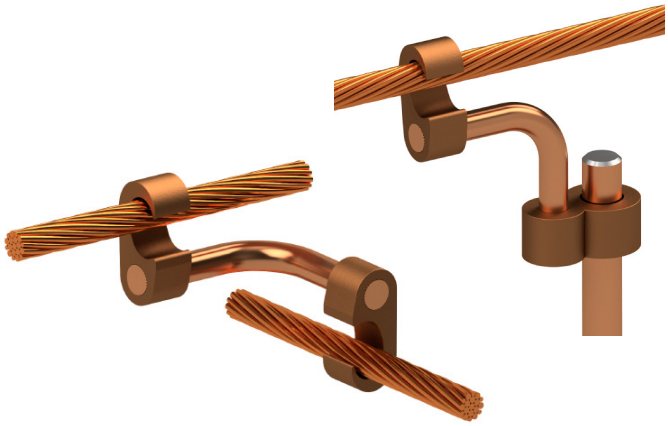
Part No.	Cable to Ground Rod ①		Installation Data		Approx. Each Wt. (lbs.)
	Conductor Range (A)	Ground Rod Range (B)	Die Index	No. of Crimps	
CGCRFE2/0212	#2 Str. - 2/0 Str.	1/2″	U998	1	0.4
CGCRFE2/0258		5/8″		1	0.4
CGCRFE2/0234		3/4″		1	0.5
CGCRFE2504/012	4/0 Str. - 250 MCM	1/2″		1	0.4
CGCRFE2504/058		5/8″		1	0.5
CGCRFE2504/034		3/4″		1	0.5
CGCRFE50030058	300 MCM - 500 MCM	5/8″		1	0.4

Notes:
① For ground rod to wire applications, ground rod must be precrimped, see Precrimp Die Chart.
- Available in tinned versions. Add prefix "T".
- Available with factory applied antioxidant. Add suffix "-A".
- A 12-ton tool is required for these connections.

Precrimp Die Chart	
Ground Rod Diameter	Dies
1/2″	U2CABT
5/8″	U2CABT
3/4″	U2CABT

Compression Grounding Series CGCX





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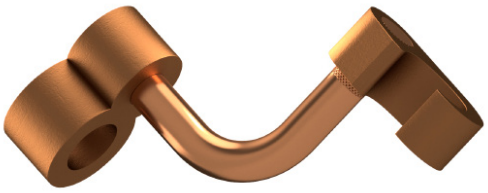
Part No.	Cable to Cable		Cable to Ground Rod ①		Cable to Reinforcing Steel ②	
	Conductor Range (A)	Conductor Range (B)	Conductor Range (A)	Ground Rod Range (B)	Conductor Range (A)	Reinforcing Steel Range (B)
CGCX2502	#2 Str. - 250 MCM	#2 Str. - 250 MCM	#2 Str. - 250 MCM	1/2" - 5/8" Rod	#2 Str. - 250 MCM	#3 - #4 Reinforcing Steel
CGCX2506		250 MCM - 500 MCM		5/8" - 3/4" Rod		#5 - #6 Reinforcing Steel

Part No.	Installation Data (A, B)		Approx. Each Wt. (lbs.)
	Die Index	No. of Crimps	
CGCX2502	U997	1	1
CGCX2506	U997, U998	1	1.1

Notes:
① Ground Rods must be precrimped. See Precrimp Die Chart.
② Clean rust and protective coatings from reinforcing steel prior to installation to provide proper ground connection. Precrimping is not required.
- When attaching connector to ground rod, ground rod must be embossed with appropriate precrimping die.
- Available in tinned versions. Add prefix "T".
- Available with factory applied antioxidant. Add suffix "-A".
- A 12-ton tool is required for these connections.

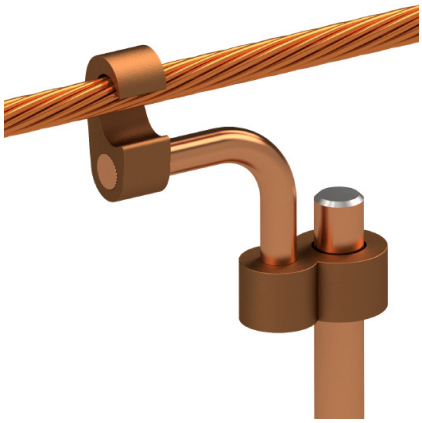
Precrimp Die Chart	
Ground Rod Diameter	Dies
1/2"	U2CABT
5/8"	U2CABT
3/4"	U2CABT

Compression Grounding Series CGFEXCR



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Part No.	Cable to Ground Rod ① / Reinforcing Steel ②		Installation Data (A, B)		Approx. Each Wt. (lbs.)
	Conductor Range (A)	Ground Rod / Reinforcing Steel Range (B)	Die Index	No. of Crimps	
CGFEXCR250212	#2 Str. - 250 MCM	1/2” / #3 - #4 Reinforcing Steel	U997, U998	1	0.8
CGFEXCR50025012	250 MCM - 500 MCM	1/2” / #3 - #4 Reinforcing Steel	U998	1	1
CGFEXCR250258	#2 Str. - 250 MCM	5/8” / #5 - #6 Reinforcing Steel	U997, U998	1	0.9
CGFEXCR50025058	250 MCM - 500 MCM	5/8” / #5 - #6 Reinforcing Steel	U998	1	1
CGFEXCR250234	#2 Str. - 250 MCM	3/4” / #5 - #6 Reinforcing Steel	U997, U998	1	1
CGFEXCR50025034	250 MCM - 500 MCM	3/4” / #5 - #6 Reinforcing Steel	U998	1	1.2

Notes:
① Ground Rods must be precrimped. See Precrimp Die Chart.
② Clean rust and protective coatings from reinforcing steel prior to installation to provide proper ground connection. Precrimping is not required.
- When attaching connector to ground rod, ground rod must be embossed with appropriate precrimping die.
- Available in tinned versions. Add prefix "T".
- Available with factory applied antioxidant. Add suffix “-A”.
- A 12-ton tool is required for these connections.

Precrimp Die Chart	
Ground Rod Diameter	Dies
1/2”	U2CABT
5/8”	U2CABT
3/4”	U2CABT

C-Type Compression Taps

Connects two copper conductors together with a hydraulic crimp tool.

Heavy Duty C-Taps

Part No.	Conductor (AWG)		Die Index	Approx. Each Wt. (lbs.)
	Run	Tap		
CT4666	#4 Str. - #6 Sol.	#6 Str. - #6 Sol.	BG	0.1
CT4446	#4 Str. - #6 Sol.	#4 Str. - #4 Sol.	BG	0.1
CT2248	#2 Str. - #2 Sol.	#4 Str. - #8 Sol.	C	0.1
CT2222	#2 Str. - #2 Sol.	#2 Str. - #2 Sol.	C	0.1
CT22/0	2/0 Str. - 1/0 Sol.	#2 Str. - #8 Sol.	O	0.2
CT24/0	4/0 Str. - 3/0 Sol.	#2 Str. - #6 Sol.	D3	0.2
CT2/02/0	2/0 Str. - 1/0 Sol.	2/0 Str. - 1/0 Sol.	O	0.2
CT4/02/0	4/0 Str. - 3/0 Sol.	2/0 Str. - 1/0 Sol.	D3	0.3
CT4/04/0	4/0 Str. - 3/0 Sol.	4/0 Str. - 3/0 Sol.	D3	0.3



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Light Duty C-Taps

Part No.	Conductor (AWG)		Color Code	Approx. Each Wt. (lbs.)
	Run	Tap		
CT4666LD	6 Str. 5, 4	8 - 6 Str. 12 - 8	Brown	0.1
CT2248LD	4 Str. 3 Str. 2 Str.	4 Str. 5 Str. 12 - 6 Str.	Pink	0.1
CT2222LD	2 Str. 2 Sol.	2 Str. - 2 Sol. 3 Str. - 3 Sol.	Orange	0.1
	1 Str. 1 Sol.	4 Str. - 4 Sol. 3 Str. - 3 Sol.		
	1/0 Str. 1/0 Sol.	12 Str. - 12 Sol. 4 Str. - 4 Sol.		



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- Additional sizes available. Contact factory for more information.

One Hole, Standard Barrel Compression Lugs

Part No.	Conductor Size (AWG)	Hardware Size	Alternate Conductor Size	Color Code
GECL6	6	1/4"	#6 Flex, 6 Sol	Blue
GECL63/8	6	3/8"	#6 Flex, 6 Sol	Blue
GECL4	4	1/4"	#4 Sol	Gray
GECL43/8	4	3/8"	#4 Sol	Gray
GECL21/4	2	1/4"	#2 Sol	Brown
GECL2	2	5/16"	#2 Sol	Brown
GECL23/8	2	3/8"	#2 Sol	Brown
GECL1/0	1/0	3/8"	#1 Flex	Pink
GECL2/0	2/0	3/8"	1/0 Flex	Black
GECL4/0	4/0	1/2"	3/0 Flex	Purple
GECL250	250	1/2"	4/0 Flex	Yellow
GECL500	500	1/2"	350 G,H,I,K,M FLEX 373.7 DLO	Brown



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One Hole, Long Barrel Compression Lugs

Part No.	Conductor Size (AWG)	Hardware Size	Alternate Conductor Size	Inspection Port	Color Code
GECLB8NP	8	1/4"	#8 Flex, 8 Sol	No	Red
GECLB83/8NP	8	3/8"	#8 Flex, 8 Sol	No	Red
GECLB6	6	1/4"	#6 Flex, 6 Sol	Yes	Blue
GECLB63/8	6	3/8"	#6 Flex, 6 Sol	Yes	Blue
GECLB6NP	6	1/4"	#6 Flex, 6 Sol	No	Blue
GECLB63/8NP	6	3/8"	#6 Flex, 6 Sol	No	Blue
GECLB4	4	1/4"	#4 Sol	Yes	Gray
GECLB43/8	4	3/8"	#4 Sol	Yes	Gray
GECLB21/4	2	1/4"	#2 Sol	Yes	Brown
GECLB21/4NP	2	1/4"	#2 Sol	No	Brown
GECLB2	2	5/16"	#2 Sol	Yes	Brown
GECLB23/8	2	3/8"	#2 Sol	Yes	Brown
GECLB23/8NP	2	3/8"	#2 Sol	No	Brown
GECLB1/0	1/0	3/8"	#1 Flex	Yes	Pink
GECLB2/0	2/0	3/8"	1/0 Flex	Yes	Black
GECLB4/0	4/0	1/2"	3/0 Flex	Yes	Purple
GECLB250	250	1/2"	4/0 Flex	Yes	Yellow
GECLB500	500	1/2"	350 G,H,I,K,M FLEX 373.7 DLO	Yes	Brown

Inspection Port



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No Inspection Port

Two Hole, Long Barrel Compression Lugs



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Part No.	Conductor Size (AWG)	O.C. Dim. B/T Holes	Hardware Size	Alternate Conductor Size	Inspection Port	Color Code
GECLB82ANP	8	.625"	1/4"	#8 Flex, 8 Sol	No	Red
GECLB82CNP	8	1”	3/8"	#8 Flex, 8 Sol	No	Red
GECLB62A	6	.625"	1/4"	#6 Flex, 6 Sol	Yes	Blue
GECLB62ANP	6	.625"	1/4"	#6 Flex, 6 Sol	No	Blue
GECLB62B	6	.75"	3/8"	#6 Flex, 6 Sol	Yes	Blue
GECLB62C	6	1"	3/8"	#6 Flex, 6 Sol	Yes	Blue
GECLB62CNP	6	1"	3/8"	#6 Flex, 6 Sol	No	Blue
GECLB42A	4	.625"	1/4"	#4 Sol	Yes	Gray
GECLB42B	4	.75"	1/4"	#4 Sol	Yes	Gray
GECLB42C	4	1"	3/8"	#4 Sol	Yes	Gray
GECLB22BS	2 Sol.	.75"	3/8"	#4 Flex	Yes	White
GECLB22CS	2 Sol.	1"	3/8"	#4 Flex	Yes	White
GECLB22CSNP	2 Sol.	1"	3/8"	#4 Flex	No	White
GECLB22A	2	.625"	1/4"	#2 Sol	Yes	Brown
GECLB22B	2	.75"	3/8"	#2 Sol	Yes	Brown
GECLB22C	2	1"	3/8"	#2 Sol	Yes	Brown
GECLB22CNP	2	1"	3/8"	#2 Sol	No	Brown
GECLB1/02C	1/0	1"	3/8"	#1 Flex	Yes	Pink
GECLB1/02D	1/0	1.75"	1/2"	#1 Flex	Yes	Pink
GECLB2/02C	2/0	1"	3/8"	1/0 Flex	Yes	Black
GECLB2/02D	2/0	1.75"	1/2"	1/0 Flex	Yes	Black
GECLB3/02C	3/0	1"	3/8"	2/0 Flex	Yes	Orange
GECLB4/02C	4/0	1"	3/8"	3/0 Flex	Yes	Purple
GECLB4/02D	4/0	1.75"	1/2"	3/0 Flex	Yes	Purple
GECLB2502C	250	1"	3/8"	4/0 Flex	Yes	Yellow
GECLB2502D	250	1.75"	1/2"	4/0 Flex	Yes	Yellow
GECLB5002C	500	1"	3/8"	350 G,H,I,K,M FLEX 373.7 DLO	Yes	Brown
GECLB5002D	500	1.75"	1/2"	350 G,H,I,K,M FLEX 373.7 DLO	Yes	Brown
GECLB7502C	750	1"	3/8"	600 G,H,I,M FLEX 646.4 DLO	Yes	Black
GECLB7502D	750	1.75"	1/2"	600 G,H,I,M FLEX 646.4 DLO	Yes	Black

- Manufactured from electro plated tinned copper.
- For use on copper or tinned copper conductors.
- Additional sizes available. Contact factory for more information.

Two Hole, Slotted, Long Barrel Compression Lugs



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Part No.	Conductor Size (AWG)	Hole Spacing Range	Hardware Size	Alternate Conductor Size	Inspection Port	Color Codes
GECLB62BC	6	.75" to 1"	3/8"	#6 Flex, 6 Sol	Yes	Blue
GECLB62BC250BK*	6	.75" to 1"	3/8"	#6 Flex, 6 Sol	Yes	Blue
GECLB62BCNP	6	.75" to 1"	3/8"	#6 Flex, 6 Sol	No	Blue
GECLB62BCNP250BK*	6	.75" to 1"	3/8"	#6 Flex, 6 Sol	No	Blue
GECLB22BCS	2 Sol.	.75" to 1"	3/8"	#4 Flex	Yes	White
GECLB22BCS250BK*	2 Sol.	.75" to 1"	3/8"	#4 Flex	Yes	White
GECLB22BCSNP	2 Sol.	.75" to 1"	3/8"	#4 Flex	No	White
GECLB22BCSNP250BK*	2 Sol.	.75" to 1"	3/8"	#4 Flex	No	White
GECLB22BC	2	.75" to 1"	3/8"	#2 Sol	Yes	Brown
GECLB22BC250BK*	2	.75" to 1"	3/8"	#2 Sol	Yes	Brown
GECLB22BCNP	2	.75" to 1"	3/8"	#2 Sol	No	Brown
GECLB22BCNP250BK*	2	.75" to 1"	3/8"	#2 Sol	No	Brown

* 250 lugs packaged in a one gallon bucket.

Specialized Compression Lugs



GECLB62EIA

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GECLB62EIA90

Part No.	Conductor Size (AWG)	Hole Spacing Range	Hardware Size	Bend Angle	Inspection Port	Color Code
GECLB62EIA	6 or 6 FLEX	.5" - .625"	1/4"	No Bend	Yes	Blue
GECLB62EIA90	6 or 6 FLEX	.5" - .625"	1/4"	90°	Yes	Blue

- Designed to fit standard EIA spacing.

NOTES:
- Manufactured from electro plated tinned copper.
- For use on copper or tinned copper conductors.
- Additional sizes available. Contact factory for more information.

Long Barrel Butt Splices



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Part No.	Color	Conductor Size (AWG)	Alternate Conductor Size
CLBBS8	Red	8	#8 Flex, 8 Sol
CLBBS6	Blue	6	#6 Flex, 6 Sol
CLBBS4	Gray	4	#4 Sol
CLBB2S	White	2 Sol.	#4 Flex
CLBBS2	Brown	2	#2 Sol
CLBBS2/0	Black	2/0	1/0 Flex
CLBBS4/0	Purple	4/0	3/0 Flex
CLBBS250	Yellow	250	4/0 Flex
CLBBS500	Brown	500	350 G,H,I,K,M FLEX 373.7 DLO

Mechanical Compression Tools



Part No.	Length	Approx. Each Wt. (lbs.)
MCT	24"	5

- Dieless adjustable compression tool with steel handle.
- Works with copper conductor sizes #8 AWG through 250 MCM and aluminum conductors #8 AWG through 4/0.
- For use with compression lugs and light duty compression taps.
- Approximately 2 tons of force.



Part No.	Length	Approx. Each Wt. (lbs.)
MCT101/0	10-1/2"	3

- Works with copper compression lugs sizes #10 through 1/0.
- Handle length facilitates two-handed crimps when necessary.
- Approximately 2 tons of force.
- Dies included.

Mechanicals

Terminal Lugs, Split Bolts & Pipe Clamps

Index

Description **Page**

Dual Rated Two-Hole Aluminum Lay-In Lug 120
One-Hole Tinned Copper Lay-In Lug 120
Copper Terminal Lugs 120
Copper Offset Terminal Lugs 121
Copper Split Bolts 121
Cable Connectors 122
Bonding Clamps 123
Pipe Bonding Straps 124
Cable Tray Clamp 125
Reinforcing Steel & Pipe Ground Clamps 126
Water Pipe Ground Clamps 126
Conduit Bonding Clamps 126
CPC Pipe Clamps 127
Universal Pipe Clamps 128

NOTE: Copper materials can consist of copper, bronze or brass. All are copper alloys.

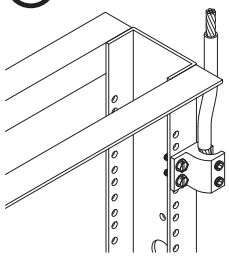
Dual Rated Two-Hole Aluminum Lay-In Lug

Part No.	Conductor Range (AWG)		Hardware Size	O.C. Spacing	Approx. Each Wt. (lbs.)
	Maximum	Minimum			
LI2/0142	2/0	14	1/4"	5/8"	0.25



- Approximately 1-5/8" x 1-1/2" electro-tin plated aluminum lug allows attachment of copper or aluminum conductors to racks and cabinets.
- Includes two 3/8" x 1" hex head socket set screws. Requires a 3/16" Hex Key (not included).
- Meets ANSI/TIA-607 two-hole mounting recommendations.
- Allows grounding of racks and cabinets utilizing standard EIA/TIA hole spacing.
- Parallel mounting direction allows for effective cable management.
- When using copper conductors, apply HAAJC8 Antioxidant (page 148).

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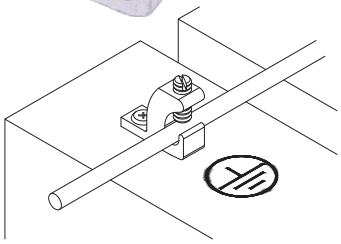
One-Hole Tinned Copper Lay-In Lug

Part No.	Conductor Range (AWG)		Hardware Size	Approx. Each Wt. (lbs.)
	Maximum	Minimum		
TCLI414DB	4	14	#10	0.07



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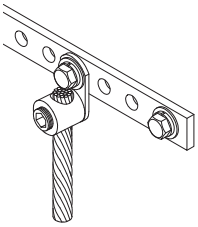
- Used for grounding or continuous loop bonding in applications such as pool grounding or PV array frame grounding.
- Approximately 1-1/8" x 3/8" x 7/8" electro-tin plated copper lug.
- Includes slotted stainless steel set screw.
- Allows conductor to be layed in without cutting conductor.
- Corrosion resistant.
- Suitable for direct burial in earth & concrete.



Copper Terminal Lugs

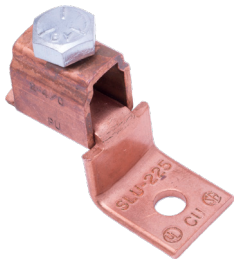
Part No.	Conductor Range (AWG)		Hardware Size	Ampere Rating	Approx. Each Wt. (lbs.)
	Maximum	Minimum			
GEL1	8 Str.	14 Sol.	#8	35	0.05
GEL2	4 Str.	14 Sol.	1/4"	70	0.05
GEL3	1/0 Str.	8 Sol.	5/16"	125	0.15
GEL4	250 MCM	6 Sol.	3/8"	250	0.20



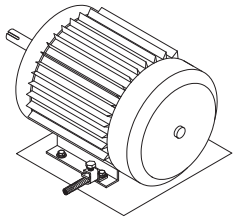


Copper Offset Terminal Lugs

Part No.	Conductor Range (AWG)		Hardware Size	Ampere Rating	Approx. Each Wt. (lbs.)
	Maximum	Minimum			
GEOL1	10 Str.	14 Str.	#8	25	0.05
GEOL2	6 Str.	14 Str.	#8	50	0.05
GEOL3	2 Str.	8 Str.	1/4"	70	0.05
GEOL4	1/0 Str.	8 Str.	1/4"	125	0.15
GEOL5	4/0 Str.	2 Str.	3/8"	225	0.25
GEOL500MCM	500 MCM	1/0 Str.	1/2"	400	0.80



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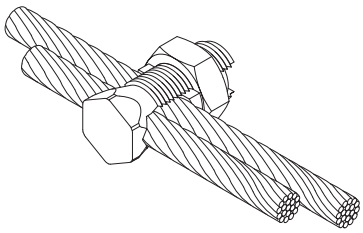
Copper Split Bolts

Part No.	Conductor Range for Equal Main (AWG)	Minimum Tap	Approx. Each Wt. (lbs.)
GESB8	16 Str. - 8 Str.	16 Str.	0.05
GESB6	4 Sol. - 8 Sol.	16 Sol.	0.06
GESB2	2 Str. - 6 Sol.	14 Str.	0.13
GESB1/0	1/0 Str. - 4 Sol.	14 Sol.	0.16
GESB2/0	2/0 Str. - 2 Sol.	14 Str.	0.18
GESB4/0	4/0 Str. - 1/0 Sol.	10 Sol.	0.35
GESB250	250 MCM - 1/0 Str.	10 Sol.	0.38

- Suitable for direct burial in earth & concrete.



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Additional sizes available. Contact the factory for more information.

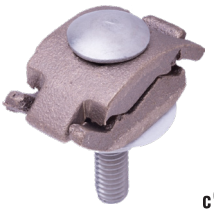
Cable Connectors

1 Bolt Bonding Connectors

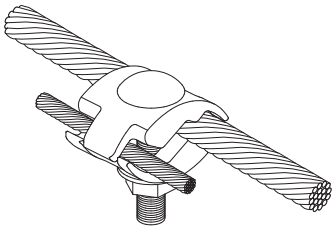
Part No.	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
208	Copper	#6 - 4/0	0.2
208T	ETPB*	#6 - 4/0	0.2

- Approximately 7/8" x 1-5/8" one bolt, two piece connector splices conductor up to 9/16" diameter.
- 5/16" x 1-7/8" stainless steel carriage bolts, flat washer and nut included.
- Suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze.



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1 Bolt Parallel Connectors

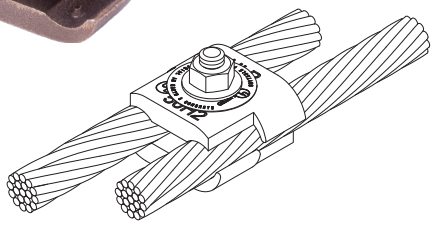
Part No.	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
B1BC	Copper	#6 - 250 MCM	0.4
TB1BC	ETPB*	#6 - 250 MCM	0.4

- Approximately 2" square, two piece connector provides over 1-1/2" surface contact between conductors.
- 5/16" x 1-7/8" stainless steel cap screw with flat washer and nut included.
- Suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze.



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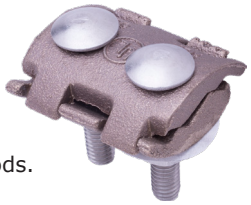


2 Bolt Parallel Connectors

Part No.	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
204	Copper	#6 - 250 MCM	0.5
204T	ETPB*	#6 - 250 MCM	0.5

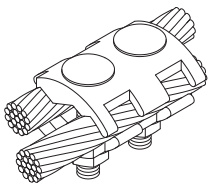
- Approximately 2" x 1-3/4" two piece connector used for splicing cables and rods.
- 5/16" x 1-7/8" stainless steel carriage bolts, flat washers and nuts included.
- 204 - Rated for direct burial in earth & concrete.
- 204T - Suitable for direct burial in earth & concrete.

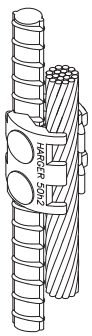
*ETPB - Electro Tin Plated Bronze.



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Bonding Clamps

Cable to Flat Metal Connectors

Part No.	Tamper Proof	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
213	No	Copper	#6 - 250 MCM	0.4
213T	No	ETPB*	#6 - 250 MCM	0.4
213TTP	Yes	ETPB*	#6 - 250 MCM	0.4

- Approximately 1-3/4" x 2" two piece, one bolt connector connects conductors through 37/64" diameter to flat metal objects up to 1/2" thickness such as steel ladders, small I-beams, channel, etc.
- 5/16" x 1-1/4" stainless steel cap screw with flat washer included.
- Suitable for direct burial in earth & concrete.

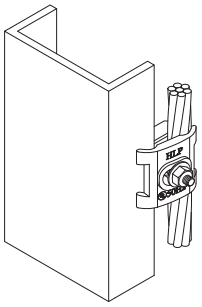
*ETPB - Electro Tin Plated Bronze.



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Tamper Proof Hardware

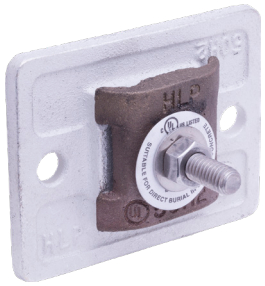


Bonding Plate

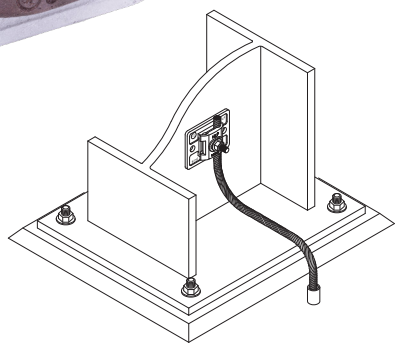
Part No.	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
217	ETPB*	#6 - 4/0	0.7

- Features a pressed-in stud which ensures a flat mounting surface.
- Approximately 2-1/2" x 3-1/4" cast bonding plate provides over 8 square inches of bonding surface.
- Dual cable pressure connector accepts conductors up to 9/16" diameter.
- Two 5/16" mounting holes provide secure mounting.
- Suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze.



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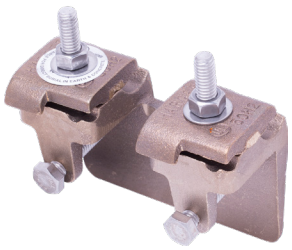
APPLICATION NOTES:

- It is imperative to properly prepare the bonding surface before applying the bonding lug or plate. All paint, rust, moisture and debris must be removed. Ensure all surface oxidants have been removed. Generously coat the bonding surface with the appropriate antioxidant (see page 148), then install the bonding lug or plate.

Bonding Clamps

Flange Bonding Clamp

Part No.	Tamper Proof	Material	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
223	No	Copper	#6 - 500 MCM	1.6
223T	No	ETPB*	#6 - 500 MCM	1.7
223TP	Yes	Copper	#6 - 500 MCM	1.7
223TTP	Yes	ETPB*	#6 - 500 MCM	1.7



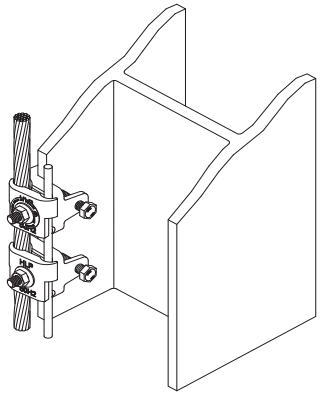
c UL us Listed 467
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- Approximately 2" x 4" bonding plate provides over 8 square inches of bonding surface.
- Large cable connector offers 3" of contact between the bonding plate and the cable.
- UL 467 Listed from #6 AWG through 1/0 AWG, accommodates all main size conductors up to 500MCM or 5/8" diameter.
- Bonding to steel I-beams up to 1" thick.
- Suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze.



Tamper Proof Hardware



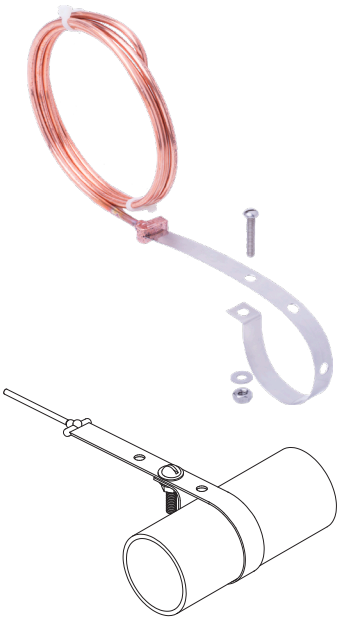
APPLICATION NOTES:

- It is imperative to properly prepare the bonding surface before applying the bonding lug or plate. All paint, rust, moisture and debris must be removed. Ensure all surface oxidants have been removed. Generously coat the bonding surface with the appropriate antioxidant (see page 148), then install the bonding lug or plate.

Pipe Bonding Straps

Part No.	OD Tube Size	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
231S2-2	1-1/2" - 2-1/2"	2 Solid	1.1
231S2-4	1-1/2" - 2-1/2"	4 Solid	1.1
231S2-6	1-1/2" - 2-1/2"	6 Solid	1.1

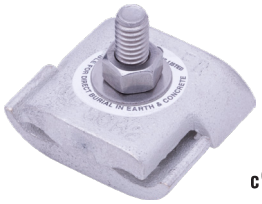
- For use in agricultural environments such as milking parlors or hog confinement facilities.
- Stainless steel bonding strap designed to fit 1-1/2" to 2-1/2" outside diameter tubing.
- Includes a 5 foot copper conductor exothermically welded to the strap.



Cable Tray Clamps

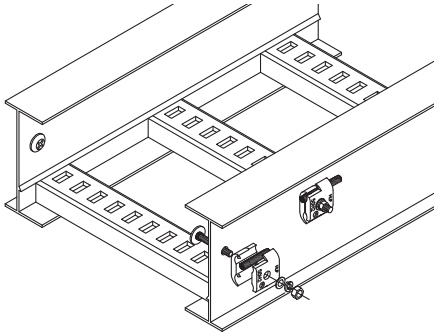
Tinned Bronze Cable Tray Clamp

Part No.	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
TBCTC	#6 Solid through 250 MCM	0.5



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- Used for bonding galvanized steel or aluminum cable trays to the grounding electrode system.
- TBCTC can replace 3 clamps from other manufacturers due to its conductor range taking design.
- Electro-tin plated cast bronze.
- Two-piece connector provides a 1-1/2" linear surface contact between conductors and the clamp.
- 18-8 stainless steel ribbed neck 3/8" bolt with low profile #4 Phillips head can be driven into a 0.44" hole to prevent rotation during installation.
- Aluminum conductors should be wire brushed and used with a Zinc based antioxidant (HAAJC8 page 148).
- Suitable for direct burial in earth & concrete.

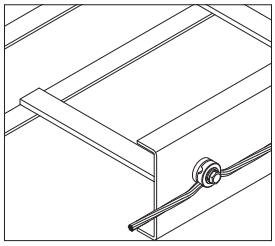


Tin Plated Cable Tray Clamp

Part No.	Conductor Size (AWG)	Approx. Each Wt. (lbs.)	UL Mark
CRGC6	6	0.2	Yes
CRGC4	4	0.3	No
CRGC2	2	0.4	Yes



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- Used for bonding galvanized steel or aluminum cable trays to the grounding electrode system.
- Used when welded connections are not feasible.
- Unique design allows clamps to form connections at most any angle.
- Electro-tin plated brass.

Strut Channel Bonding Clamp

Part No.	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
SCBC158	#6 AWG - 250 MCM	0.5

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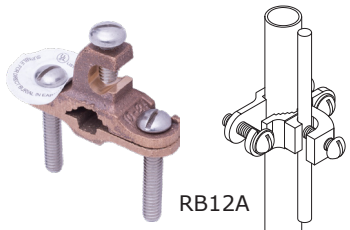


- Bonds #6 through 250 MCM conductor to 1-5/8" x 1-5/8" and 1-5/8" x 1-3/8" strut channel.
- Electro-tin plated bronze.
- Suitable for direct burial in earth and concrete.
- UL Listed 467 from #6 AWG thru 1/0 AWG.

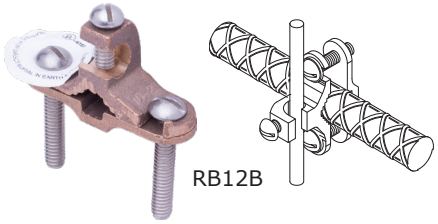
Reinforcing Steel & Pipe Clamps

Part No.	Reinforcing Steel Range	Pipe Range	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
RB12A	3/8" - 1"	1/2" x 1"	10 Sol. - 2 Str.	0.3
RB12B	3/8" - 1"	1/2" x 1"	10 Sol. - 2 Str.	0.3

- Manufactured from high conductivity copper alloy.
- Suitable for direct burial in earth & concrete.
- Lay-in feature speeds installation.
- RB12A is for parallel mounted conductors.
- RB12B is for perpendicular mounted conductors.



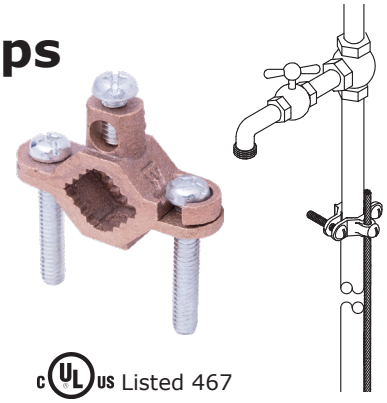
c UL us Listed 467



Water Pipe Ground Clamps

Part No.	Ground Rod or Pipe Size	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
BGC4	1/2" - 1"	#10 - #2	0.2
BGC41.25-2	1-1/4" - 2"	#10 - #2	0.6
BGC42.5-4	2-1/2" - 4"	#10 - #2	1.1

- Bronze clamp has many uses such as bonding to ground rods or copper water pipes.
- Meets NFPA 54 requirements for bonding to stainless steel gas piping.



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Conduit Bonding Clamps

Part No.	Conduit Range	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
BGC4SCS	1/2" - 3/4"	#10 - #2	0.2
TBGC4SCS*	1/2" - 3/4"	#10 - #2	0.2
TBGC4SCSSS**	1/2" - 3/4"	#10 - #2	0.2

- Bronze clamp for bonding conduits that are flush mounted to a surface such as a wall, floor or ceiling.
- Low Profile design utilizes 1/4" diameter long machine screws.

* Electro tin plated bronze.

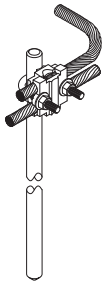
** Includes stainless steel hardware. Suitable for direct burial in earth & concrete.



c UL us Listed 467

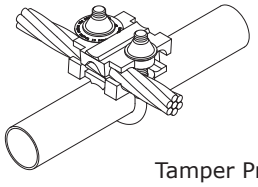
CPC Pipe Clamps

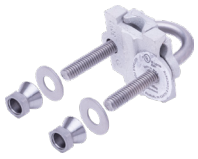
- Wide conductor range; #6 Solid through 250 MCM.
- Also used for pedestal grounding.
- Silicon Bronze hardware available.
- Manufactured from electro tin plated bronze with stainless steel hardware.
- Dual UL Listing (UL96 and UL467).
- Rated for direct burial in earth & concrete.
- Tamper Proof comes with break away nuts.





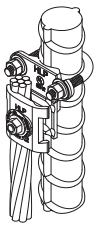
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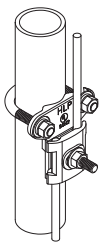




Tamper Proof

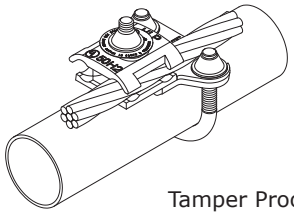
Part No.	Tamper Proof Part No.	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC.5/.75	CPC.5/.75TP	.5" - .75"	0.375" - 1"	0.5







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DB DIRECT BURIAL

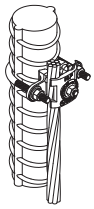


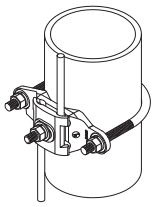


Tamper Proof

Part No.	Tamper Proof Part No.	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1/1.25	CPC1/1.25TP	1" - 1.25"	0.9375" - 1.7"	0.8

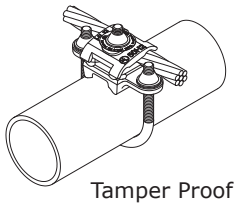
- Features "quick connect", bi-directional design.
- Pressed stud design ensures a flush mounting surface.







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DB DIRECT BURIAL





Tamper Proof

Part No.	Tamper Proof Part No.	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1.5/2	CPC1.5/2TP	1.5" - 2"	1.25" - 2.4"	0.8
CPC2.5/3	CPC2.5/3TP	2.5" - 3"	2.5" - 3.5"	1.0
CPC3.5/4	CPC3.5/4TP	3.5" - 4"	3.375" - 4.5"	1.3
CPC5/6	CPC5/6TP	5" - 6"	4.75" - 6.63"	1.7

- Features "quick connect", bi-directional design.
- Pressed stud design ensures a flush mounting surface.
- When using ductile-iron piping, verify actual outside diameter of piping against chart above.

Universal Pipe Clamps

Part No.	Material	Nominal Pipe Size	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
UPC.75/1.25	Tinned Copper	.75" - 1.25"	1.05" - 1.66"	0.9
UPC1.5/2	Tinned Copper	1.5" - 2"	1.9" - 2.375"	1.3
UPC2.5/3	Tinned Copper	2.5" - 3"	2.875" - 3.5"	1.3
UPC3.5/4	Tinned Copper	3.5" - 4"	4" - 4.5"	1.4
UPC5/6	Tinned Copper	5" - 6"	5.563" - 6.625"	1.8

- All clamps provide 1-1/2" of contact area to ensure sufficient electrical contact for both ground fault and lightning current.
- Lug ends are 1/4" x 1" and have holes that are 3/8" diameter 1" on center spacing.
- The UPC.75/1.25 provides bi-directional grounding capabilities making it an ideal connection for grounding fence rail to fence post applications.
- These clamps can be connected to ground conductors via exothermic connections and/or standard compression lugs.
- All clamps are manufactured from electro tinned copper and feature stainless steel hardware.



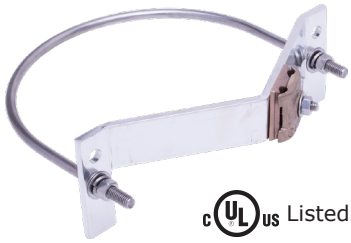
UPC.75/1.25

c UL us Listed 467



UPC

Part No.	Material	Nominal Pipe Size	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
UPC8C	Tinned Copper	8"	8.25" - 8.625"	2.7
UPC10C	Tinned Copper	10"	10.312" - 10.75"	3.0
UPC12C	Tinned Copper	12"	12.312" - 12.75"	3.4



c UL us Listed 467

- Provides bi-directional grounding capabilities making it an ideal connection for grounding large diameter pipes.
- Clamps include mechanical connector to connect ground conductors #6 AWG thru 250 MCM.
- Manufactured from electro tinned copper; includes stainless steel hardware.
- Lug ends are 1/4" x 1" and have holes that are 7/16" diameter 1" on center spacing.
- For conductors larger than 250 MCM exothermically weld to the clamp.
- Suitable for direct burial in earth & concrete.

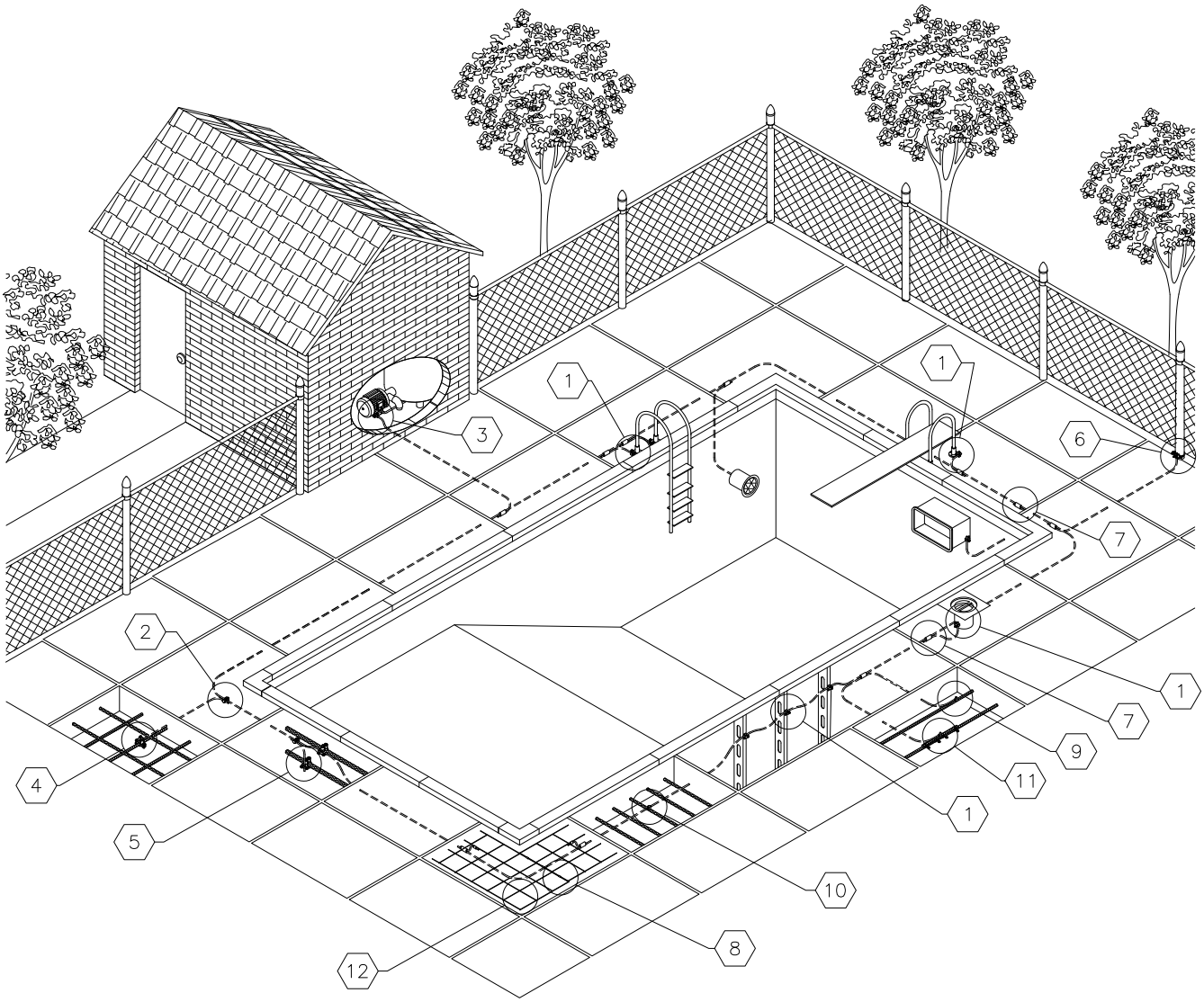
NOTES:
- Provides 1-1/2" of contact area to ensure sufficient electrical contact for both ground fault and lightning current.

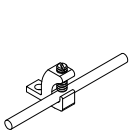
Swimming Pool Bonding & Grounding

Index

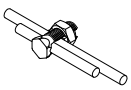
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Typical Pool Bonding & Grounding Layout	130
Pool Bonding Components	131
Pool Bonding & Grounding Technical Notes	132

Typical Pool Bonding & Grounding Layout





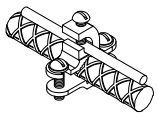
1 TCLI414DB LAY-IN LUG



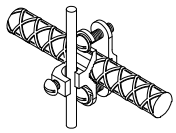
2 GESB6 SPLIT BOLT CONNECTOR



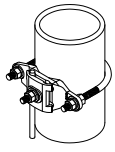
3 GEOL2 OFFSET TERMINAL LUG



4 RB12A BONDING CLAMP



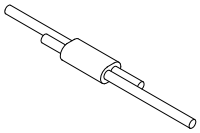
5 RB12B BONDING CLAMP



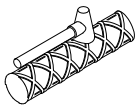
6 CPC STYLE PIPE / POST CLAMP



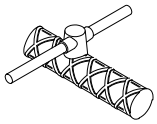
7 PT ULTRAWELD CONNECTION



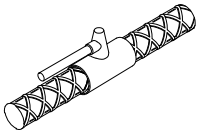
8 PS ULTRAWELD CONNECTION



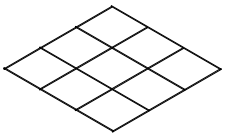
9 RP ULTRAWELD CONNECTION



10 RO ULTRAWELD CONNECTION



11 RB3GA8SX5 REBAR GROUNDING ASSEMBLY



12 PREFABRICATED GROUND MESH

Pool Bonding Components



Listed 467

1: One-Hole Tinned Copper Lay-In Lug

Part No.	Conductor Range (AWG)	Bolt Hole Size
TCLI414DB	4 - 14	#10

- Suitable for direct burial in earth & concrete.
- See Page 120 for more information.

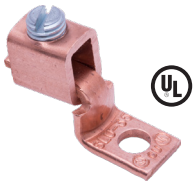


Listed 486
Listed 467

2: Copper Split Bolts

Part No.	Conductor Range for Equal Main (AWG)	Minimum Tap
GESB8	16 Str. - 8 Str.	16 Str.
GESB6	4 Sol. - 8 Sol.	16 Sol.

- Suitable for direct burial.
- See Page 121 for more information.



Listed 486

3: Copper Offset Terminal Lug

Part No.	Conductor Range (AWG)	Bolt Hole Size
GEOL2	14 Str. - 6 Str.	#8

- See Page 121 for more information.



RB12A

Listed 467



RB12B

4 & 5: Reinforcing Steel & Pipe Ground Clamps

Part No.	Pipe & R.S. Range	Conductor Range (AWG)
RB12A	3/8" - 1"	10 Sol. - 2 Str.
RB12B	3/8" - 1"	10 Sol. - 2 Str.

- Suitable for direct burial in earth & concrete.
- See Page 126 for more information.

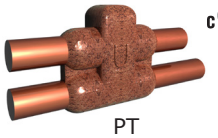


Listed 467
Listed 96
DIRECT BURIAL

6: CPC Pipe Clamps

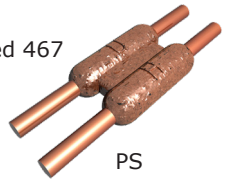
Part No.	Material	Nom. Pipe Size Range	Pipe Outside Diameter
CPC1.5/2	Tinned Bronze	1.25" - 2"	1.25" - 2.4"
CPC2.5/3	Tinned Bronze	2.5" - 3"	2.5" - 3.5"

- Suitable for direct burial in earth & concrete.
- Conductor Range #6 - 250 MCM.
- Other sizes available.
- See Pages 127 & 200 for more information (Grounding & LP Sections).



PT

Listed 467

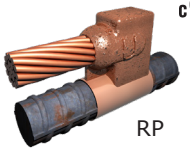


PS

7 & 8: Cable to Cable Ultraweld Exothermic Connection Molds

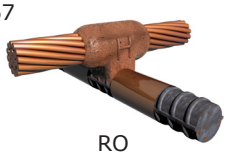
Part No.	Weld Metal		Required Handle
	UltraShot	NUWTUBE	
PT8S8SB	US25	NUWTUBE25	MH1
PS8S8SL	US25	NUWTUBE25	MH3 (Included)
PS8S6SL	US25	NUWTUBE25	MH3 (Included)

- See Page 255 & 261 for more information.



RP

Listed 467



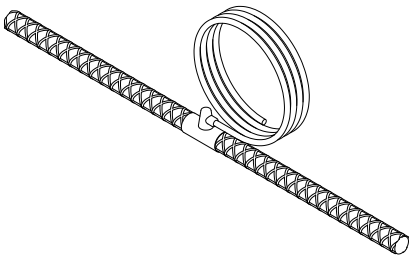
RO

9 & 10: Cable to Rebar Ultraweld Exothermic Connection Molds

Part No.	Weld Metal		Required Handle	Packing Mat'l No.
	UltraShot	NUWTUBE		
RP38SB	US25	NUWTUBE25	MH1	WRPSLV
RP4L8SA	US25	NUWTUBE25	Included	CERPM1
RO38SB	US65	NUWTUBE65	MH1	WRPSLV
RO48SB	US65	NUWTUBE65	MH1	WRPSLV
RO58SB	US65	NUWTUBE65	MH1	WRPSLV

- See Pages 286 & 287 for more information.

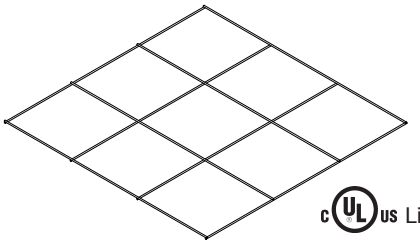
Pool Bonding Components



11: Ufer Ground Assembly

Part No.	Reinforcing Steel Size	Conductor Type (AWG)	Conductor Length (ft.)
RB3GA8SX5	3	8 Sol.	5

- Prefabricated reinforcing steel grounding assembly with exothermically welded connection.
- Standard 24" long reinforcing steel
- Can be wire tied or welded to reinforcing steel cage prior to concrete pour.
- See Page 299 for more information.



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12: Prefabricated #8 Solid Copper Ground Mesh

Part No.	Width (ft.)	Length (ft.)	Conductor Spacing (in.)
GM350812	3	50	12
GM375812	3	75	12
GM3100812	3	100	12

- Other mesh sizes and wire gauges available.
- See Pages 93 for more information.

Pool Bonding & Grounding Technical Notes

TECHNICAL NOTES:

- **680.26 Equipotential Bonding* (Summarized)**

(A) Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area.

(B) Bonded Parts. The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8**. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes.

(1) Conductive Pool Shells. Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or (B)(1)(b). Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall all be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive materials.

(a) Structural Reinforcing Steel. Unencapsulated structural reinforcing steel shall be bonded together by steel tie wires or the equivalent. Where structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with 680.26(B)(1)(b).

(b) Copper Conductor Grid. A copper conductor grid shall be provided and shall comply with (b)(1) through (b)(4).

(1) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing. The bonding shall be in accordance with 250.8 or approved means.

(2) Conform to the contour of the pool and the pool deck.

(3) Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in.).

(4) Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell.

Pool Bonding & Grounding Technical Notes

(2) Perimeter Surfaces. The perimeter surface shall extend for 1 m (3 ft.) horizontally beyond the inside walls of the pool and shall include unpaved surfaces as well as poured concrete surfaces and other types of paving. Perimeter surfaces seperated from the pool by a permanent wall or building 1.5 m (5 ft) less than 1 m (3 ft.) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.

(a) Structural Reinforcing Steel. Structural reinforcing steel shall be bonded in accordance with 680.26(B)(1)(a).

(b) Alternate Means. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper conductor(s) shall be utilized where the following requirements are met:

(1) At least one minimum 8 AWG bare solid copper conductor shall be provided.
(2) The conductors shall follow the contour of the perimeter surface.
(3) Only listed splices shall be permitted.
(4) The required conductor shall be 450 to 600 mm (18 to 24 in.) from the inside walls of the pool.
(5) The required conductor shall be secured within or under the perimeter surface 100 to 150 mm (4 in. to 6 in.) below the subgrade.

(3) Metallic Components. All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(B)(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded.

(4) Underwater Lighting.

(5) Metal Fittings.

(6) Electrical Equipment.

(7) Fixed Metal Parts. All fixed metal parts shall be bonded including, but not limited to, metal-sheathed cables and raceways, metal piping, metal awnings, metal fences, and metal door and window frames.

Exception No 1: Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded.

Exception No 2: Those greater than 1.5 m (5 ft.) horizontally of the inside walls of the pool shall not be required to be bonded.

Exception No 3: Those greater than 3.7 m (12 ft.) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures, shall not be required to be bonded.

(C) Pool Water. Where none of the bonded parts is in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm2 (9 in.2) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities,and it shall be bonded in accordance with 680.26(B).

- **250.8 Connection of Grounding and Bonding Equipment****

(A) Permitted Methods. Equipment grounding conductors, grounding electrodes conductors, and bonding jumpers shall be connected by one of the following means:

(1) Listed pressure connectors
(2) Terminal bars
(3) Pressure connectors listed as grounding and bonding equipment
(4) Exothermic welding process
(5) Machine screw-type fasteners that engage not less than two threads or are secured with a nut
(6) Thread-forming machine screws that engage not less than two threads in the enclosure
(7) Connections that are part of a listed assembly
(8) Other listed means

(B) Methods Not Permitted. Connection devices or fittings that depend soley on solder shall not be used.

*NEC 2023 Equipotential Bonding Article 680.26
**NEC 2023 Connection of Grounding and Bonding Equipment Article 250.8

Fence Bonding/Grounding Equipment

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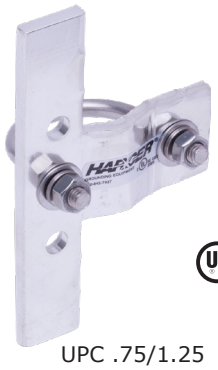
Description **Page**

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Fence Gate Assemblies.....136
Flexible Gate Jumpers.....137
Fence Clamp Assemblies 138
Fence Fabric Clamps 140

Universal Pipe Clamps

Part No.	Material	Nominal Pipe Size	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
UPC.75/1.25	Tinned Copper	.75" - 1.25"	1.05" - 1.66"	0.9
UPC1.5/2	Tinned Copper	1.5" - 2"	1.9" - 2.375"	1.3
UPC2.5/3	Tinned Copper	2.5" - 3"	2.875" - 3.5"	1.3
UPC3.5/4	Tinned Copper	3.5" - 4"	4" - 4.5"	1.4
UPC5/6	Tinned Copper	5" - 6"	5.563" - 6.625"	1.8

- All clamps provide 1-1/2" of contact area to ensure sufficient electrical contact for both ground fault and lightning current.
- Lug ends are 1/4" x 1" and have holes that are 3/8" diameter 1" on center spacing.
- The UPC.75/1.25 provides bi-directional grounding capabilities making it an ideal connection for grounding fence rail to fence post applications.
- These clamps can be connected to ground conductors via exothermic connections and/or standard compression lugs.
- All clamps are manufactured from electro tinned copper and feature stainless steel hardware.



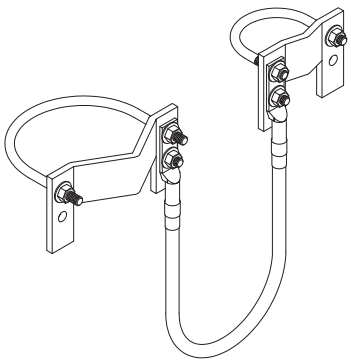
Listed 467

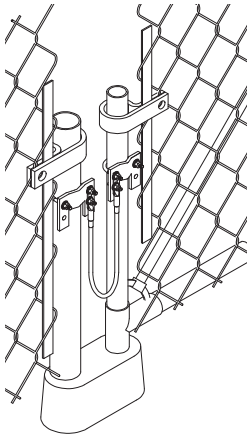
UPC .75/1.25



UPC

Fence Gate Assemblies
(Compression Lugs)





Part No.	Nominal Gate Post Size Range	Nominal Fence Post Size Range	Jumper Size (AWG)	Jumper Length	Approx. Each Wt. (lbs.)
FGA1.5/2-2.5/32WC24	1.5" - 2"	2.5" - 3"	#2	24"	2.5
FGA1.5/2-3.5/42WC24	1.5" - 2"	3.5" - 4"	#2	24"	3.0
FGA1.5/2-5/62WC24	1.5" - 2"	5" - 6"	#2	24"	3.5

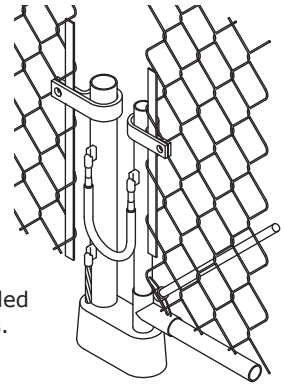
- Integral component of a fence grounding system.
- Helps eliminate dangerous touch potential.
- Used when it is not feasible to exothermically bond to fence/gate posts.
- Flex jumper assemblies use #2 AWG Welding Cable.
- Shipped unassembled.

Flexible Gate Jumpers

Part No.	Conductor Size (AWG)	Exothermic Mold Size	Approx. Each Wt. (lbs.)
GJX2S24	2	#2 solid	0.6
GJX2/024	2/0	2/0 stranded	1.1
GJX4/024	4/0	4/0 stranded	1.7



- Can be used with CPC's on page 127.
- Flexible jumpers made from welding cable.
- Standard length is 24" long.
- Additional lengths available. Contact factory for more information.



Gate Jumper welded directly to posts.

VDRFP (Fence Post) Connection

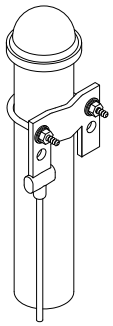
Mold Part No.	Cable Size	Nominal Fence Post Size	Weld Metal		Required Handle
			UltraShot	NuwTube	
VDRFP2SB	#2 Sol	1-1/4" to 4" Post	US65	NUWTUBE65	MH1
VDRFP2B	#2	1-1/4" to 4" Post	US65	NUWTUBE65	
VDRFP1/0B	1/0	1-1/4" to 4" Post	US90	NUWTUBE90	
VDRFP2/0B	2/0	1-1/4" to 4" Post	US90	NUWTUBE90	
VDRFP4/0B	4/0	1-1/4" to 4" Post	US115	NUWTUBE115	

• See Page 300 for more informaiton.

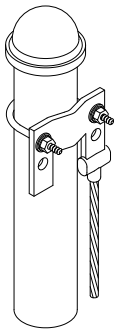
NOTE:

- Thin walled pipe may be unsuitable for exothermic connections. If experiencing burn through issues with the pipe (typically with 2/0 or 4/0 conductors), adding sand inside the fence post well past the exothermic connection may solve this issue. Another solution uses a smaller conductor such as a #2 awg jumper which uses a smaller size weld metal. The last solution uses a mechanical fence clamp assembly such as ones found on page 140.

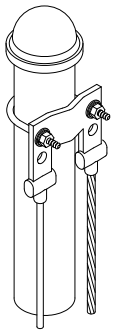
Fence Clamp Assemblies



FCAUCL2T120
3" Post
Left Ground Conductor is
#2 AWG Tinned Solid x 10' long
No Right Ground Conductor



FCAUER4/048
6" Post
Right Ground Conductor is
4/0 Concentric x 4' long
No Left Ground Conductor



FCAUBL2T48R4/036
1.5" Post
Left Ground Conductor is
#2 AWG Tinned Solid x 4' long &
Right Ground Conductor is
4/0 Concentric x 3' long

Follow the steps outlined below to specify the Fence Clamp Assembly you need.

The following **Single Wire Left** example is a **F**ence **C**lamp **A**ssembly **U**ltraweld with a nominal post size of 2.5"-3" with the left side of clamp exothermically welded to 2T AWG conductor that is 10' (120") long.

FCAU C L 2T 120

- FCAU — Fence Clamp Assembly Ultraweld
- C — Nominal Post Size (See Chart A Below)
- L — Left Side Conductor Designator
- 2T — Left Side Ground Conductor Size (See Chart B Below)
- 120 — Left Side Ground Conductor Length (in.)

The following **Double Wire** example is a **F**ence **C**lamp **A**ssembly **U**ltraweld with a nominal post size of 1.5"-2" with the left side of clamp exothermically welded to 250 MCM conductor that is 4' (48") long and the right side of clamp exothermically welded to 4/0 conductor that is 3' (36") long.

FCAU B L 25CM 48 R 4/0 36

- FCAU — Fence Clamp Assembly Ultraweld
- B — Nominal Post Size (See Chart A Below)
- L — Left Side Conductor Designator
- 25CM — Left Side Ground Conductor Size (See Chart B Below)
- 48 — Left Side Ground Conductor Length (in.)
- R — Right Side Conductor Designator
- 4/0 — Right Side Ground Conductor Size (See Chart B Below)
- 36 — Right Side Ground Conductor Length (in.)

Chart A

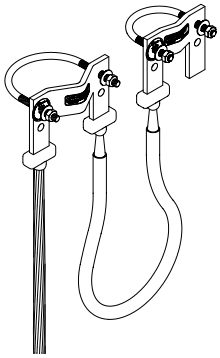
Nominal Post Size Codes
A = .75" - 1.25"
B = 1.5" - 2"
C = 2.5" - 3"
D = 3.5" - 4"
E = 5" - 6"

Chart B

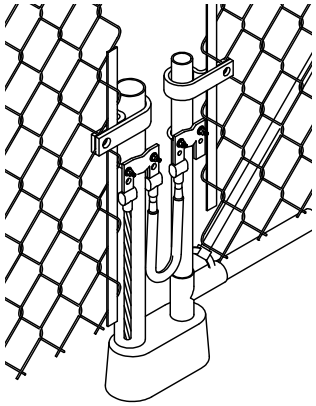
Ground Conductor Size Codes
2 = #2 AWG Bare Solid
2T = #2 AWG Tinned Solid
2-7 = #2 AWG Bare Stranded
1/0 = 1/0 Concentric
2/0 = 2/0 Concentric
4/0 = 4/0 Concentric
25CM = 250 MCM Concentric
3CM = 300 MCM Concentric
35CM = 350 MCM Concentric

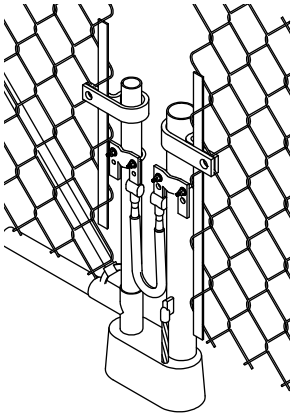
Note: 1/0 - 4/0 are supplied in standard 19 strand unless otherwise requested. 250 MCM and larger are supplied in 37 strand.

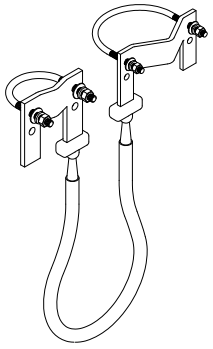
Fence Gate Assemblies
(Exothermically Welded)



FGAUCBL4/0WC2425CM48
3" Fence Post
1.5" Gate Post
Fence Post is on the **Left**
4/0 Jumper x 2' long
250 MCM Ground Conductor x 4' long







FGAUDBR2WC18
4" Fence Post
1.5" Gate Post
Fence Post is on the **Right**
#2 AWG Jumper x 1-1/2' long
No Ground Conductor

Follow the steps outlined below to specify the Fence Gate Assembly (Exothermically Welded) you need. The following example is a **F**ence **G**ate **A**ssembly **U**ltraweld with a nominal fence post size of 2.5"-3" and a nominal gate post size of 1.5"-2" with the fence post on the left, a 4/0 AWG welding cable that is 2' (24") long and a 250 MCM ground conductor that is 4' (48") long.

FGAU	C	B	L	4/0WC	24	25CM	48
Fence Gate Assembly Ultraweld	Nominal Fence Post Size (See Chart A Below)	Nominal Gate Post Size (See Chart A Below)	Fence Post Side ("L" = Left "R" = Right)	Flexible Jumper Size (See Chart B Below)	Flexible Jumper Length (in.)	Ground** Conductor Size (See Chart C Below)	Ground** Conductor Length (in.)

Chart A

Nominal Post Size Codes
A = .75" - 1.25"
B = 1.5" - 2"
C = 2.5" - 3"
D = 3.5" - 4"
E = 5" - 6"

Chart B

Flexible Jumper Size Codes
2WC = #2 AWG Welding Cable
2/0WC = 2/0 AWG Welding Cable
4/0WC = 4/0 AWG Welding Cable

Chart C

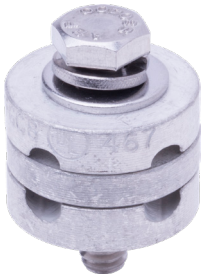
Ground Conductor Size Codes
2 = #2 AWG Bare Solid
2T = #2 AWG Tinned Solid
2-7 = #2 AWG Bare Stranded
1/0 = 1/0 Concentric
2/0 = 2/0 Concentric
4/0 = 4/0 Concentric
25CM = 250 MCM Concentric
3CM = 300 MCM Concentric
35CM = 350 MCM Concentric

Note: 1/0 - 4/0 are supplied in standard 19 strand unless otherwise requested. 250 MCM and larger are supplied in 37 strand.

****If ground conductor is not required, then leave ground conductor size and length blank.**

Fence Fabric Clamps

Part No.	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
FGC8	#8	0.3
FGC6	#6	0.2
FGC4	#4	0.2
FGC2	#2	0.2
FGC1/0	1/0	0.2
FGC2/0	2/0	0.4
FGC2-3/0*	#2 & 3/0	0.4
FGC2-4/0**	#2 & 4/0	0.7



*Accepts a #2 AWG and/or 3/0 AWG conductor.
**Accepts a #2 AWG and/or 4/0 AWG conductor.

Tamper Proof

Part No.	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
FGC8TP	#8	0.3
FGC6TP	#6	0.2
FGC4TP	#4	0.2
FGC2TP	#2	0.2
FGC26TP	#2 & #6	0.2
FGC2/0TP	2/0	0.4
FGC2-4/0TP**	#2 & 4/0	0.7



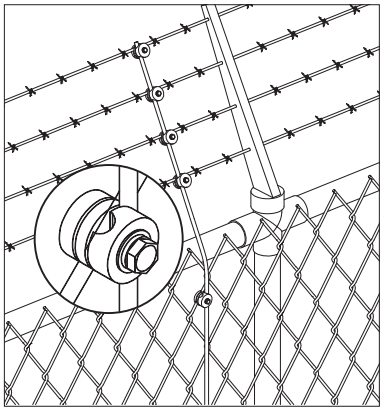
**Accepts a #2 AWG and/or 4/0 AWG conductor.

NOTES:

- Design allows clamp to form connections at any angle.
- Designed for 9 thru 6 gauge (0.148” - 0.192”) fence fabric.
- Contact factory for applications outside of listed ranges.
- Specific uses include connection to both fence fabric and barbed wire.
- The conductor maintains a direct path to ground while connected to an object that is parallel, perpendicular or any degree in between.
- Electro tin plated brass clamp includes stainless steel hardware.
- Allows for use with most metallic surfaces including galvanized.

Fence Bonding & Grounding Systems

Fence bonding & grounding systems are designed to provide protection against dangerous “touch” potentials. The fence fabric ground clamp is an integral component of this personnel safety system.



Hardware & Accessories

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Stainless Steel Screws

Hex Head Cap Screws

Part No.	Thread Size	Length	Pieces Per Part No.
CS44S-100	1/4-20	1/2"	100
CS46S-100	1/4-20	3/4"	100
CS48S-100	1/4-20	1"	100
CS54S-100	5/16-18	1/2"	100
CS57S-100	5/16-18	7/8"	100
CS58S-100	5/16-18	1"	100
CS510S-100	5/16-18	1-1/4"	100
CS64S-100	3/8-16	1/2"	100
CS66S-100	3/8-16	3/4"	100
CS68S-100	3/8-16	1"	100
CS610S-100	3/8-16	1-1/4"	100
CS612S-100	3/8-16	1-1/2"	100
CS616S-100	3/8-16	2"	100
CS88S-100	1/2-13	1"	100
CS108S-100	5/8-11	1"	100



- Manufactured from 18-8 stainless steel.

Slotted Round Head Machine Screws

Part No.	Thread Size	Length	Pieces Per Part No.
MS103S-100	10-24	3/8"	100
MS106S-100	10-24	3/4"	100
MS108S-100	10-24	1"	100
MS44S-100	1/4-20	1/2"	100
MS46S-100	1/4-20	3/4"	100
MS48S-100	1/4-20	1"	100
MS412S-100	1/4-20	1-1/2"	100



- Manufactured from 18-8 stainless steel.

Tamper Proof Bolt

Part No.	Thread Size	Length	Pieces Per Part No.
RHBOB45S-10	1/4-20	5/8"	10
RHBOB64S-10	3/8-16	1/2"	10
RHBOB65S-10	3/8-16	5/8"	10
RHBOB68S-10	3/8-16	1"	10



Before



After

- 303 Stainless Steel

Stainless Steel Washers & Nuts

Flat Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
W4S-100	1/4"	5/8"	100
W5S-100	5/16"	3/4"	100
W6S-100	3/8"	1"	100
W8S-100	1/2"	1-1/4"	100



Lock Washers

Part No.	Size	Pieces Per Part No.
LW4S-100	1/4"	100
LW5S-100	5/16"	100
LW6S-100	3/8"	100
LW8S-100	1/2"	100



Star Washers

Part No.	Size	Pieces Per Part No.
SW4S-100	1/4"	100
SW5S-100	5/16"	100
SW6S-100	3/8"	100
SW8S-100	1/2"	100



Fender Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
FW6S-100	3/8"	1-1/4"	100
FW8S-100	1/2"	2"	100



Dragon Tooth Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
DTW4-100	1/4"	11/16"	100
DTW6-100	3/8"	1"	100
DTW8-100	1/2"	1-1/4"	100



- Tin plated copper

Stainless Steel Washers & Nuts

Belleville Washers

Part No.	Bolt Hole Size	Max. O.D.	Min. I.D.	Thickness	Overall Height	Load to Flat (lbs.)	Pieces Per Part No.
BW4S-100	1/4"	0.500"	0.255"	0.038"	0.047"	376	100
BW6S-100	3/8"	0.750"	0.380"	0.040"	0.059"	392	100
BW8S-100	9/16"	1.125"	0.567"	0.038"	0.073"	268	100



- 300 Series Stainless Steel

Bonding Lug Washers

Part No.	Bolt Hole Size	On Center Spacing	Thickness	Overall Height	Load to Flat (lbs.)	Pieces Per Part No.
BLW4S-10	1/4"	.625"	0.038"	0.073"	268	10
BLW6S-10	3/8"	1"	0.038"	0.047"	376	10
BLW8S-10	1/2"	1.75"	0.035"	0.067"	260	10



- 300 Series Stainless Steel
- Eliminates need for flat and lock washers.
- Cleans up install by not having overlapping washers.

Nuts

Part No.	Thread Size	Pieces Per Part No.
N420S-100	1/4-20	100
N518S-100	5/16-18	100
N616S-100	3/8-16	100
N813S-100	1/2-13	100



- Manufactured from 18-8 stainless steel.

Tamper Proof Nuts

Part No.	Thread Size	Pieces Per Part No.
N420SBON-10	1/4-20	10
N518SBON-10	5/16-18	10
N616SBON-10	3/8-16	10


Before


After

- 303 Stainless Steel

Silicon Bronze Screws, Washers & Nuts

Hex Head Cap Screws

Part No.	Thread Size	Length	Pieces Per Part No.
CS46B-100	1/4-20	3/4"	100
CS58B-100	5/16-18	1"	100
CS68B-100	3/8-16	1"	100



Lock Washers

Part No.	Size	Pieces Per Part No.
LW4B-100	1/4"	100
LW5B-100	5/16"	100
LW6B-100	3/8"	100



Flat Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
W4B-100	1/4"	5/8"	100
W5B-100	5/16"	3/4"	100
W6B-100	3/8"	1"	100



Nuts

Part No.	Thread Size	Pieces Per Part No.
N420B-100	1/4-20	100
N518B-100	5/16-18	100
N616B-100	3/8-16	100



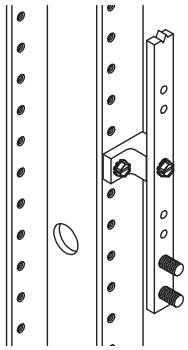
Neoprene Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
W6R-50	3/8"	1-3/8"	50
W6R-100	3/8"	1-3/8"	100
W8R-50	1/2"	1-3/8"	50
W8R-100	1/2"	1-3/8"	100



Thread Forming Screw

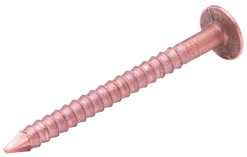




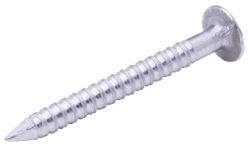
Part No.	Pieces Per Part No.
SMS0126SHWZ-50	50

- #12-24 x 5/8" zinc plated, thread forming, paint removing, hex washer head screw with external washer.
- Used with white standoff insulators (11/16WINS & 7/8WINS).

Nails



Copper Ringed



Stainless Steel Ringed



Copper Common



Aluminum Common

Part No.	Description	Length	Diameter Head	Pieces Per Part No.
274-100	4d Copper Ringed	1-1/2"	3/8"	100
274S-100	4d Stainless Steel Ringed	1-1/2"	5/16"	100
A274-100	4d Aluminum Common	1-5/8"	1/4"	100
275-100	6d Copper Common	2-1/8"	1/4"	100
277S-100	6d Stainless Steel Ringed	2"	3/8"	100

TEKS Screws

Teks / 3

Part No.	Pieces Per Part No.
295-25	25
295-100	100



- No. 12-14 x 3/4" long stainless steel Teks / 3 self drilling and threading screw.
- General purpose screw for use with 12 through 26 gauge steel.

Teks / 5

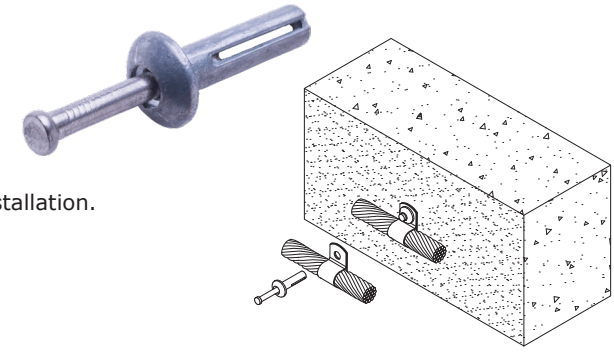
Part No.	Pieces Per Part No.
296-25	25
296-100	100



- No. 12-24 x 1-1/4" stainless steel Teks / 5 self drilling and threading screw.
- Heavy duty screw for use with 1/4” through 26 gauge steel.
- Ideal for installing bonding plates.

Expansion Anchors

Part No.	Size	Pieces Per Part No.
280-25	1/4 x 1"	25
280-100	1/4 x 1"	100
281-25	1/4 x 1-1/2"	25
281-100	1/4 x 1-1/2"	100



- Stainless steel pin and Zamac #7 body for corrosion resistant installation.
- Anchor requires a 1/4" diameter mounting hole.

Abrasive Pad & Cold Galvanizing Spray



Abrasive Pad

Part No.	Unit Wt. (oz.)
3MABPAD	2

- Pad removes oxidation from surface when properly used. Critical step when making a low resistance connection.



Cold Galvanizing Spray

Part No.	Unit Size (oz.)
CGS	14

- Instant cold galvanizing spray provides protection similar to hot dip galvanizing.
- Used for touching up surfaces affected by welding.
- Actual weight of the can is 19 oz.

Antioxidant Joint Compound

Aluminum

Part No.	Size
HAAJC1/2	1/2 oz.
HAAJC8	8 oz.

- Oxide inhibiting joint compound used to improve electrical conductivity and enhance the integrity of the connection.
- Synthetic base with suspended zinc particles.
- Material is gray in color.
- Recommended for aluminum to aluminum connections, aluminum to copper connections and aluminum conduit threads.





Copper

Part No.	Size
HCAJC1/2	1/2 oz.
HCAJC8	8 oz.

- Oxide inhibiting joint compound used to improve electrical conductivity and enhance the integrity of the connection.
- Synthetic base with suspended copper particles.
- Material is copper in color.
- Recommended for copper to copper connections, copper threads and all grounding applications.

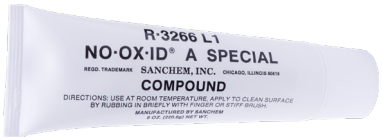




NO•OX•ID® Antioxidant Paste

Part No.	Size	Package
NOOXCLR	8 oz.	Tube
NOOXCLRTC	8 oz.	Tin Can with Brush

- Cold applied clear antioxidant for aluminum to aluminum, aluminum to copper, and copper to copper connections.





Lightning Protection Components

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UL Standards

96: Lightning Protection Components

467: Grounding and Bonding Components

c(UL)us: Indicates part is listed for use in Canada and the United States of America

Lightning Conductors & Accessories

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Class I Copper Conductors

Intended for use on structures up to and including 75' in height.



c UL us Listed 96

Part No.	No. of Strands	Strand Size	X-Sectional Area in CM	Electro Tin Plated	Diameter	Wt. lbs./M ft.	Reel/Coil Size	Reel/Coil Wt. (lbs.)
24-25COIL	24	14 AWG	107,700	No	7/16"	326	25'	8
24-50COIL	24	14 AWG	107,700	No	7/16"	326	50'	16
24-100	24	14 AWG	107,700	No	7/16"	326	100'	37
24-250	24	14 AWG	107,700	No	7/16"	326	250'	90
29-25COIL	29	16 AWG	64,000	No	3/8"	192	25'	5
29-50COIL	29	16 AWG	64,000	No	3/8"	192	50'	11
29-100	29	16 AWG	64,000	No	3/8"	192	100'	24
29-250	29	16 AWG	64,000	No	3/8"	192	250'	55
29-500	29	16 AWG	64,000	No	3/8"	192	500'	112
29T-25COIL	29	16 AWG	64,000	Yes	3/8"	192	25'	5
29T-50COIL	29	16 AWG	64,000	Yes	3/8"	192	50'	11
29T-100	29	16 AWG	64,000	Yes	3/8"	192	100'	24
29T-250	29	16 AWG	64,000	Yes	3/8"	192	250'	55
29T-500	29	16 AWG	64,000	Yes	3/8"	192	500'	112
32-25COIL	32	16 AWG	70,700	No	7/16"	224	25'	5
32-50COIL	32	16 AWG	70,700	No	7/16"	224	50'	11
32-100	32	16 AWG	70,700	No	7/16"	224	100'	27
32-250	32	16 AWG	70,700	No	7/16"	224	250'	62
32-500	32	16 AWG	70,700	No	7/16"	224	500'	122
32T-25COIL	32	16 AWG	70,700	Yes	7/16"	224	25'	6
32T-50COIL	32	16 AWG	70,700	Yes	7/16"	224	50'	11
32T-100	32	16 AWG	70,700	Yes	7/16"	224	100'	27
32T-250	32	16 AWG	70,700	Yes	7/16"	224	250'	62
32T-500	32	16 AWG	70,700	Yes	7/16"	224	500'	122

• All dimensions and weights are approximate.

TECHNICAL 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.
- Conductors are marked in 3' intervals to aid in installation.

Class II Copper Conductors

Intended for use on structures greater than 75' in height.



c UL us Listed 96

Part No.	No. of Strands	Strand Size	X-Sectional Area in CM	Electro Tin Plated	Diameter	Wt. lbs./M ft.	Reel/Coil Size	Reel/Coil Wt. (lbs.)
28-25COIL	28	14 AWG	122,000	No	1/2"	386	25'	10
28-50COIL	28	14 AWG	122,000	No	1/2"	386	50'	19
28-100	28	14 AWG	122,000	No	1/2"	386	100'	39
28-250	28	14 AWG	122,000	No	1/2"	386	250'	103
28T-25COIL	28	14 AWG	122,000	Yes	1/2"	386	25'	10
28T-50COIL	28	14 AWG	122,000	Yes	1/2"	386	50'	19
28T-100	28	14 AWG	122,000	Yes	1/2"	386	100'	39
28T-250	28	14 AWG	122,000	Yes	1/2"	386	250'	103
20	28	0.069	131,500	No	1/2"	420	CTL*	-
20T	28	0.069	131,500	Yes	1/2"	420	CTL*	-
40-28	28	0.087	211,500	No	5/8"	660	CTL*	-

• All dimensions and weights are approximate.
• 40-28 listed as a Class III Copper Conductor.
* CTL - Cut to Length

TECHNICAL 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.
- Conductors are marked in 3' intervals to aid in installation.

Class I Aluminum Conductors

Intended for use on structures up to and including 75' in height.



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Part No.	No. of Strands	Strand Size	X-Sectional Area in CM	Diameter	Wt. lbs./M ft.	Reel/Coil Size	Reel/Coil Wt. (lbs.)
A24-25COIL	24	14 AWG	98,600	7/16"	95	25'	3
A24-50COIL	24	14 AWG	98,600	7/16"	95	50'	5
A24-100	24	14 AWG	98,600	7/16"	95	100'	13
A24-250	24	14 AWG	98,600	7/16"	95	250'	28
A24-500	24	14 AWG	98,600	7/16"	95	500'	56
A28-25COIL	28	14 AWG	115,000	1/2"	112	25'	3
A28-50COIL	28	14 AWG	115,000	1/2"	112	50'	6
A28-100	28	14 AWG	115,000	1/2"	112	100'	13
A28-250	28	14 AWG	115,000	1/2"	112	250'	33
A28-500	28	14 AWG	115,000	1/2"	112	500'	66

• All dimensions and weights are approximate.

TECHNICAL NOTES:

- Class I 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 I Minimum Requirements:
  - 95 pounds per 1,000 feet.
  - Cross-sectional area of 98,600 circular mils.
  - Minimum strand size 14 AWG.
- Conductors are marked in 3' intervals to aid in installation.

Class II Aluminum Conductors

Intended for use on structures greater than 75' in height.



A37R (rope lay)

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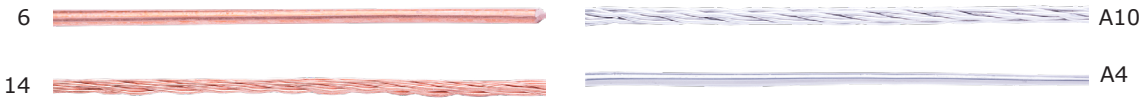
Part No.	No. of Strands	Strand Size	X-Sectional Area in CM	Diameter	Wt. lbs./M ft.	Reel/Coil Size	Reel/Coil Wt. (lbs.)
A37R-25COIL	37	13 AWG	205,400	19/32"	190	25'	5
A37R-50COIL	37	13 AWG	205,400	19/32"	190	50'	10
A37R-100	37	13 AWG	205,400	19/32"	190	100'	23
A37R-250	37	13 AWG	205,400	19/32"	190	250'	56
A37R-500	37	13 AWG	205,400	19/32"	190	500'	112

• All dimensions and weights are approximate.

TECHNICAL NOTES:

- Class II Minimum Requirements:
  - 190 pounds per 1,000 feet.
  - Cross-sectional area of 192,000 circular mils.
  - Minimum strand size 13 AWG.
- Conductors are marked in 3' intervals to aid in installation.

Bonding Conductors



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Part No.	Material	No. of Strands	Strand Size	X-Sectional Area in CM	Diameter	Wt. lbs./M ft.
6	Copper	1	6 AWG	26,250	1/6"	80
14	Copper	14	16 AWG	28,000	1/4"	92
A10	Aluminum	10	14 AWG	41,100	5/16"	39
A4	Aluminum	1	4 AWG	41,740	13/64"	39

• All dimensions and weights are approximate.
• All are Cut to Length.

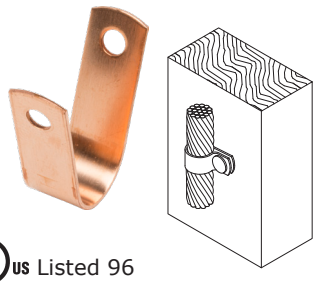
TECHNICAL NOTES:

- Class I & II Minimum Requirements:
  - Copper bonding conductors: 17 AWG, 26,240 circular mils.
  - Aluminum bonding conductors: 14 AWG, 41,100 circular mils.

Nail Clips

Part No.	Material	Fits Lightning Conductors	Fits Grounding Conductors	Box Qty.	Approx Box Wt. (lbs.)
250	Copper	28	2/0	100	1
A250	Aluminum	A28	N/A	100	0.5

- Hole diameter is 5/32 (.156 in.)
- For use with nails such as 274 & 277S.



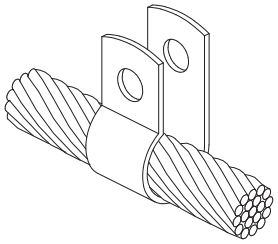
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Pre-formed Cable Clips

Part No.	Material	Fits Lightning Conductors	Fits Grounding Conductors	Box Qty.	Approx Box Wt. (lbs.)
ACC1	Aluminum	A10	N/A	100	0.5
ACC2	Aluminum	A28 & A24	N/A	100	0.5
ACC3	Aluminum	A37	N/A	100	0.5
ACC4	Aluminum	A37R	N/A	100	0.5
CCC1	Copper	#14	2 Str., 4 Str., 2 Sol.	100	2.0
CCC1T	ETPC*	#14	2 Str., 4 Str., 2 Sol.	100	2.0
CCC2	Copper	29 & 32	1/0 Str. & 2/0 Str.	100	2.3
CCC2T	ETPC*	29 & 32	1/0 Str. & 2/0 Str.	100	2.3
CCC3	Copper	28 & 24	4/0	100	2.5
CCC3T	ETPC*	28 & 24	4/0	100	2.5
CCC4	Copper	40-28	250 MCM	100	2.8
CCC4T	ETPC*	40-28	250 MCM	100	2.8



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- Copper cable loop fasteners manufactured from soft drawn copper coil.
- Aluminum cable fasteners manufactured from aluminum.
- 9/32" (.280 in.) hole to accept 1/4" hardware.

* ETPC - Electro Tin Plated Copper

TECHNICAL NOTES:

- Conductors shall be fastened to the structure upon which they are placed at intervals not exceeding 3 ft (1 m).*
- Clips for securing copper conductors shall be cast or made from sheet copper with a minimum thickness of 0.032 in (0.81 mm) and a minimum width of 3/8 in (9.5 mm).**
- Aluminum clips for securing aluminum conductors shall be of cast aluminum or made from sheet aluminum with a minimum thickness of 0.051 in (1.3 mm) thick and a minimum thickness of 1/2 in (12.7 mm) wide.**

*NFPA 780 Conductor Fasteners

**UL96 Cable Mounting Clips and Fasteners

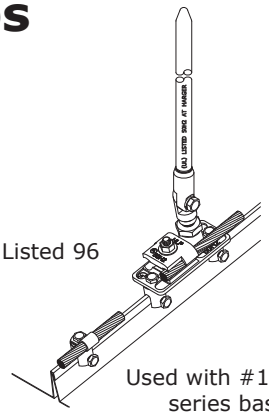
Standing Seam Clamps

Part No.	Material	Max Seam Size	Approx Each Wt. (lbs.)
CUSC	Copper	1/4"	0.2
ALSC	Aluminum	1/4"	0.1

- Cable clips not included.



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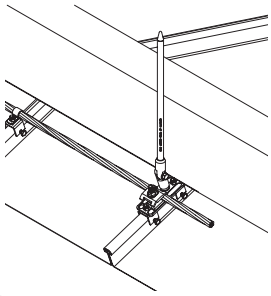
Used with #151xxI series base

Part No.	Description	Max Seam Size	Approx Each Wt. (lbs.)
SSSC	Stainless Steel - 2 Bolt	3/4"	0.2
SSSC1	Stainless Steel - 1 Bolt	1"	0.1
SSSC2	Stainless Steel - 2 Bolt	1"	0.3

- Maximum clamp depth is 5/8".
- SSSC produced with tabs over the hardware to prevent damage to the roof seam.
- Cable clips not included.



SSSC





SSSC1



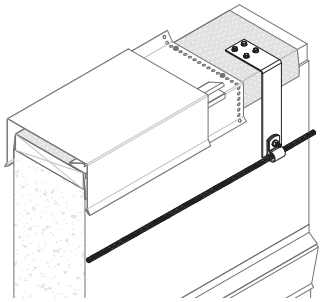
SSSC2

Concealed Coping Cable Holders

Part No.	Material	Class	Approx. Each Wt. (lbs.)
ACCH2	Aluminum	1	0.3
CCH2	Copper	1	0.6
ACCH4	Aluminum	2	0.3
CCH3	Copper	2	0.6

- Mounts under coping.
- Stainless Steel options available.



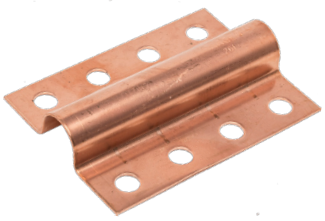


Adhesive Cable Holders

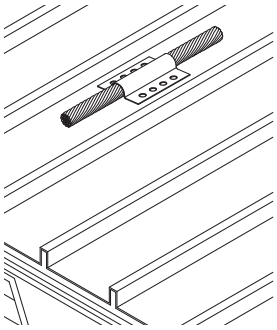
Part No.	Material	Approx Each Wt. (lbs.)
261	Stamped Copper	0.1
A261	Aluminum	0.1
261T	ETPC*	0.1

- Stamped copper adhesive cable holder.
- Used with all cables through 3/0 or up to 1/2" diameter.
- Fast installing cable holder designed to permit movement of thermally expanding or contracting cables.

*ETPC - Electro Tin Plated Copper



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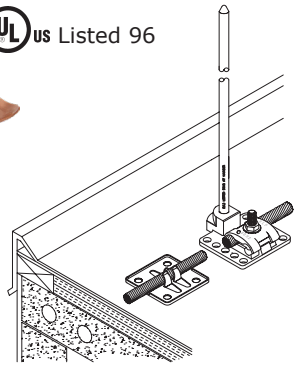
Part No.	Material	Approx Each Wt. (lbs.)
262	Stamped Copper	0.1
A262	Aluminum	0.1
262T	ETPC*	0.1

- Stamped copper cable holder secured by a surface compatible adhesive.
- Designed for use with all cables through 4/0 or up to 9/16" diameter.

*ETPC - Electro Tin Plated Copper



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TECHNICAL NOTES:

- Conductors shall be fastened to the structure upon which they are placed at intervals not exceeding 3 ft (1 m).*
- Clips for securing copper conductors shall be cast or made from sheet copper with a minimum thickness of 0.032 in (0.81 mm) and a minimum width of 3/8 in (9.5 mm).**
- Aluminum clips for securing aluminum conductors shall be of cast aluminum or made from sheet aluminum with a minimum thickness of 0.051 in (1.3 mm) thick and a minimum thickness of 1/2 in (12.7 mm) wide.**

*NFPA 780 Conductor Fasteners
**UL96 Cable Mounting Clips and Fasteners

Adhesives

M-1 Structural Sealant

Part No.	Color	Approx Each Wt. (lbs.)
M1-10OZ-B	Black	1
M1-10OZ-G	Gray	1
M1-10OZ-L	Limestone	1
M1-10OZ-W	White	1

- 10.1 fluid oz. cartridge
- Develops 300 PSI shear strength on metal, masonry and wood.
- TPOPRIMERLVOC required for TPO roofs.
- Contains no volatile organic solvents. (No VOC's)
- Service temperature: -40°F to 200°F



DuraSil High Performance Sealant

Part No.	Color	Approx Each Wt. (lbs.)
DURASIL	Translucent	1

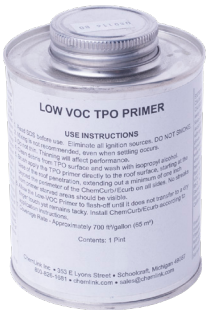
- 10.1 fluid oz. cartridge
- Bonds to Kynar 500® and Tedlar® PVF coated surfaces
- Contains no volatile organic solvents. (No VOC's)
- Service temperature: -80 °F to 400°F



Low VOC TPO Primer

Part No.	Approx Each Wt. (lbs.)
TPOPRIMERLVOC	1

- Pint (16 oz) can
- Low VOC TPO primer.
- Used to prime TPO roofing membrane, plastics, and any other difficult bonding surface prior to using M-1 adhesive to secure air terminal bases and cable holders.



APPLICATION NOTES:

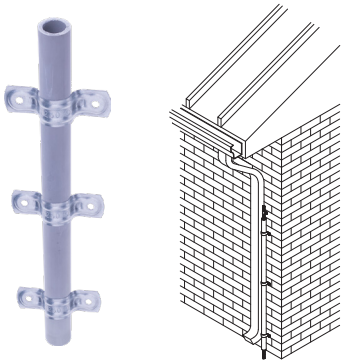
- M1 Structural Sealant is designed for difficult bonding and sealing applications such as low slope commercial roofing. It bonds aggressively to EPDM, PVC, BUR, coal tar, SBS mod bit, granulated APP, many types of coated metal, metal flashing details and FRP.
- DuraSil High-Performance Sealant is highly effective at bonding and sealing surfaces such as Kynar 500® and Tedlar® PVF and effective when employed in extreme service temperatures (-80°F to 400°F).
- Application coverage (M1/DuraSil) is approximately 40 cable holders or 40 bases per 10.1 fluid oz. cartridge.
- Surface must be free of all dirt, oil, loose paint, frost or other contaminations. DO NOT USE petroleum solvents such as mineral spirits or xylene.

Cable Guards

PVC

Part No.	Approx Each Wt. (lbs.)
1PVCCG	3.4

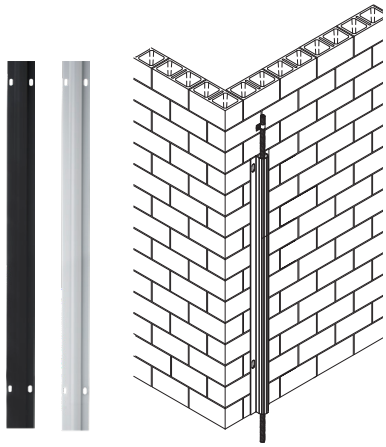
- 1" x 8' SCH80 PVC cable guard for protecting all secondary and main sized lightning conductors.
- Three galvanized fastening clips included for mounting with 1/4" screws or masonry anchors.



Plastic

Part No.	Color	Approx Each Wt. (lbs.)
321B	Black	1.3
321G	Gray	1.3

- 1/2" x 8' extruded thermoplastic cable guard with flanges provides concealment and protection for main sized lightning conductors.



Walkway Trip Guard

Part No.	Color	Material	Approx Each Wt. (lbs.)
WWCG4G	Gray	Plastic Extrusion	0.4
WWCG4B	Black	Plastic Extrusion	0.4

- 4' extruded thermoplastic cable guard with flanges provides concealment and main sized lightning conductors.
- Additional holes provided to allow attachment on rooftop walkways to prevent trip hazards.



TECHNICAL NOTE:

- Down conductors located in runways, driveways, school playgrounds, cattle yards, public walks, or other locations subject to physical damage or displacement shall be guarded. Metallic guards shall be bonded at each end. The down conductor shall be protected for a minimum distance of 6 ft (1.8 m) above grade level.*

*NFPA 780 Protecting Down Conductors

Air Terminals & Accessories

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NOTE:
Air Terminals are also known as Strike Termination Devices or Lightning Rods.

Class I Copper Air Terminals

3/8" Diameter

Part No. Copper	Part No. Nickel Plated	Part No. Tin Plated	Length	Approx Each Wt. (lbs.)
3810CUAT	3810CUATN	3810CUATT	10"	0.4
3812CUAT	3812CUATN	3812CUATT	12"	0.4
3816CUAT	3816CUATN	3816CUATT	16"	0.6
3818CUAT	3818CUATN	3818CUATT	18"	0.7
3824CUAT	3824CUATN	3824CUATT	24"	0.9
3836CUAT	3836CUATN	3836CUATT	36"	1.3
3848CUAT	3848CUATN	3848CUATT	48"	1.7

- Manufactured from highly conductive electrolytic tough pitch copper alloy 110.
- Conductivity greater than 99% when annealed.
- Manufactured with standard UNC threads.
- Additional lengths available. Contact factory for more information.



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TECHNICAL NOTES:

- Class I air terminals are used on structures up to and including 75' in height.
- For longer air terminals, select an air terminal and combine with extension rods and couplers on page 173.
- Class I Minimum Requirements:
  - Minimum diameter is 3/8" solid.
  - The tip of an air terminal shall be not less than 10 in (254 mm) above the object or area it is to protect.*

*NFPA 780 Air Terminal Height

- Air terminals shall be secured against overturning or displacement by one of the following methods: (1) Attachment to the object to be protected, (2) Braces that are permanently and rigidly attached to the structure. Air terminals exceeding 24 in (600 mm) in height shall be supported at a point not less than one-half their height.**

**NFPA 780 Air Terminal Support

Class II Copper Air Terminals

1/2" & 5/8" Diameter

Part No. Copper	Part No. Nickel Plated	Part No. Tin Plated	Diameter	Length	Approx Each Wt. (lbs.)
1210CUAT	1210CUATN	1210CUATT	1/2"	10"	0.6
1212CUAT	1212CUATN	1212CUATT	1/2"	12"	0.8
1216CUAT	1216CUATN	1216CUATT	1/2"	16"	1.1
1218CUAT	1218CUATN	1218CUATT	1/2"	18"	1.2
1224CUAT	1224CUATN	1224CUATT	1/2"	24"	1.6
1236CUAT	1236CUATN	1236CUATT	1/2"	36"	2.4
1248CUAT	1248CUATN	1248CUATT	1/2"	48"	3
5810CUAT	5810CUATN	5810CUATT	5/8"	10"	1
5812CUAT	5812CUATN	5812CUATT	5/8"	12"	1.2
5816CUAT	5816CUATN	5816CUATT	5/8"	16"	1.6
5818CUAT	5818CUATN	5818CUATT	5/8"	18"	1.8
5824CUAT	5824CUATN	5824CUATT	5/8"	24"	2.3
5836CUAT	5836CUATN	5836CUATT	5/8"	36"	3.6
5848CUAT	5848CUATN	5848CUATT	5/8"	48"	4.8

- Manufactured from highly conductive electrolytic tough pitch copper alloy 110.
- Conductivity greater than 99% when annealed.
- Manufactured with standard UNC threads.
- Additional lengths available. Contact factory for more information.



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TECHNICAL NOTES:

- Class II air terminals are used on structures greater than 75' in height.
- For longer air terminals, select an air terminal and combine with extension rods and couplers on page 173.
- Class II Minimum Requirements:
  - Minimum diameter is 1/2" solid.
  - The tip of an air terminal shall be not less than 10 in (254 mm) above the object or area is it to protect.*

*NFPA 780 Air Terminal Height

- Air terminals shall be secured against overturning or displacement by one of the following methods: (1) Attachment to the object to be protected, (2) Braces that are permanently and rigidly attached to the structure. Air terminals exceeding 24 in. (600 mm) in height shall be supported at a point not less than one-half their height.**

**NFPA 780 Air Terminal Support

Class I Aluminum Air Terminals

1/2" Diameter

Part No.	Length	Approx. Each Wt. (lbs.)
1210ALAT	10"	0.2
1212ALAT	12"	0.2
1216ALAT	16"	0.3
1218ALAT	18"	0.4
1224ALAT	24"	0.5
1236ALAT	36"	0.7
1248ALAT	48"	1

- Manufactured from highly conductive aluminum.
- Manufactured with standard UNC threads.
- Additional lengths available. Contact factory for more information.



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Class II Aluminum Air Terminals

5/8" Diameter

Part No.	Length	Approx. Each Wt. (lbs.)
5810ALAT	10"	0.4
5812ALAT	12"	0.4
5816ALAT	16"	0.5
5818ALAT	18"	0.7
5824ALAT	24"	0.9
5836ALAT	36"	1.1
5848ALAT	48"	1.8

- Manufactured from highly conductive aluminum.
- Manufactured with standard UNC threads.
- Additional lengths available. Contact factory for more information.



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TECHNICAL NOTES:

- Class I air terminals are used on structures up to and including 75' in height.
- Class II air terminals are used on structures greater than 75' in height.
- For longer air terminals, select an air terminal and combine with extension rods and couplers on page 173.
- Class I Minimum Requirements:
  - Minimum diameter is 1/2" solid.
  - The tip of an air terminal shall be not less than 10 in (254 mm) above the object or area it is to protect.*
- Class II Minimum Requirements:
  - Minimum diameter is 5/8" solid.
  - The tip of an air terminal shall be not less than 10 in (254 mm) above the object or area is it to protect.*

*NFPA 780 Air Terminal Height

- Air terminals shall be secured against overturning or displacement by one of the following methods: (1) Attachment to the object to be protected, (2) Braces that are permanently and rigidly attached to the structure. Air terminals exceeding 24 in (600 mm) in height shall be supported at a point not less than one-half their height.**

**NFPA 780 Air Terminal Support

Safety Tip Air Terminals

Air terminal designed with safety as well as efficacy in mind. The air terminal's tip consists of a sphere approximately 3/4" in diameter. The rounded tip helps minimize personnel injuries caused by accidental falls.

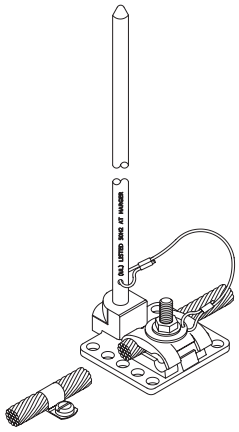
Part No.	Diameter	Length	Class	Material	Approx. Each Wt. (lbs.)
3812CSTAT	3/8"	12"	I	Copper	0.5
3816CSTAT	3/8"	16"	I	Copper	0.6
3818CSTAT	3/8"	18"	I	Copper	0.7
3824CSTAT	3/8"	24"	I	Copper	1
1212ASTAT	1/2"	12"	I	Aluminum	0.3
1212CSTAT	1/2"	12"	II	Copper	0.9
1216ASTAT	1/2"	16"	I	Aluminum	0.3
1216CSTAT	1/2"	16"	II	Copper	1.1
1218ASTAT	1/2"	18"	I	Aluminum	0.4
1218CSTAT	1/2"	18"	II	Copper	1.3
1224ASTAT	1/2"	24"	I	Aluminum	0.5
1224CSTAT	1/2"	24"	II	Copper	1.6
5812ASTAT	5/8"	12"	II	Aluminum	0.4
5812CSTAT	5/8"	12"	II	Copper	1.4
5816ASTAT	5/8"	16"	II	Aluminum	0.5
5816CSTAT	5/8"	16"	II	Copper	1.8
5818ASTAT	5/8"	18"	II	Aluminum	0.6
5818CSTAT	5/8"	18"	II	Copper	2
5824ASTAT	5/8"	24"	II	Aluminum	0.7
5824CSTAT	5/8"	24"	II	Copper	2.5

- Copper safety tipped air terminals available in electro plated tin (add suffix "T" to part number) or nickel plating (add suffix "N" to part number).
- 5/8" diameter STATs have standard UNC threads.
- For added safety, use with flexible spring adapters. See page 170.
- Additional lengths available. Contact factory for more information.



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Air Terminals with Safety Cable



Part No.	Diameter	Length	Class	Material	Approx. Each Wt. (lbs.)
1212CUAT-WSC36	1/2"	12"	II	Copper	0.9
1212ALAT-WSC36	1/2"	12"	I	Aluminum	0.3
1224CUAT-WSC36	1/2"	24"	II	Copper	1.8
5812ALAT-WSC36	5/8"	12"	II	Aluminum	0.5

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Safety Tip

Part No.	Diameter	Length	Class	Material	Approx. Each Wt. (lbs.)
1212ASTAT-WSC36	1/2"	12"	I	Aluminum	0.3
1224CSTAT-WSC36	1/2"	24"	II	Copper	1.7
1224ASTAT-WSC36	1/2"	24"	I	Aluminum	0.8
3824CSTAT-WSC36	3/8"	24"	I	Copper	1.1

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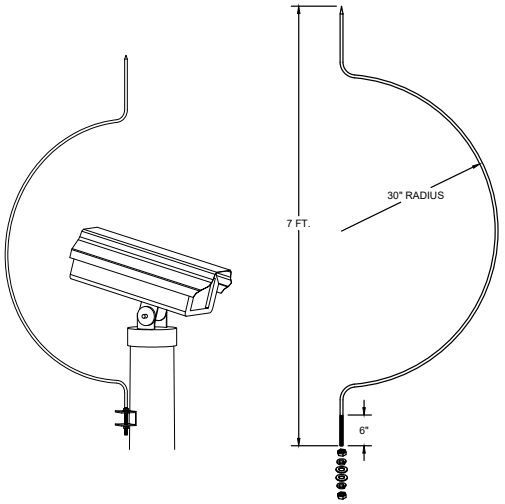
NOTES:
- Copper air terminals available in electro plated tin (add suffix "T" to part number) or nickel plating (add suffix "N" to part number).
- Comes with attached 36" safety cable.
- Cable prevents air terminal from falling off structure if air terminal detaches from base.
- Flexible spring adapters sold separately. See page 170.
- Additional lengths available. Contact factory for more information.

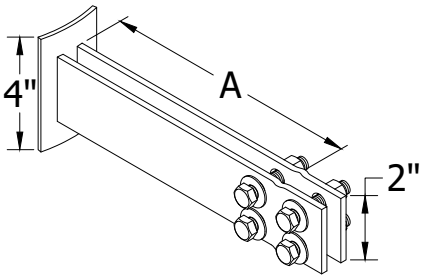
Specialty Air Terminals

Bent Copper-Bonded Air Terminals

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
5810BCCATTSE	5/8"	7'	9

- For protecting security cameras mounted on poles.
- Manufactured from 5/8" copper-bonded ground rods.
- Thread size is 5/8" in diameter and 6" in length.
- Comes with (2) JN1011S jam nuts, (2) LW10S lock washers and (2) W10S flat washers.
- Additional sizes available. Contact factory for more information.

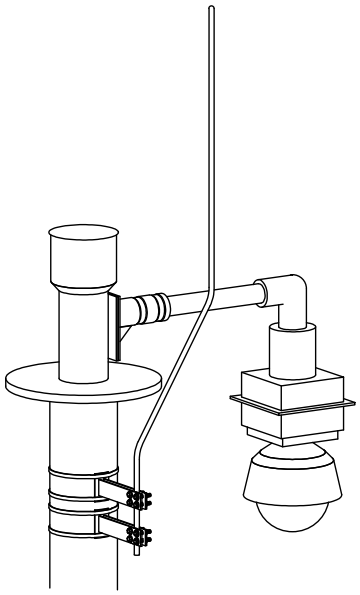




Air Terminal Clamps

Part No.	"A"	Approx. Each Wt. (lbs.)
LRCSS3/16X8	8"	2.5
LRCSS3/16X12	12"	3.5

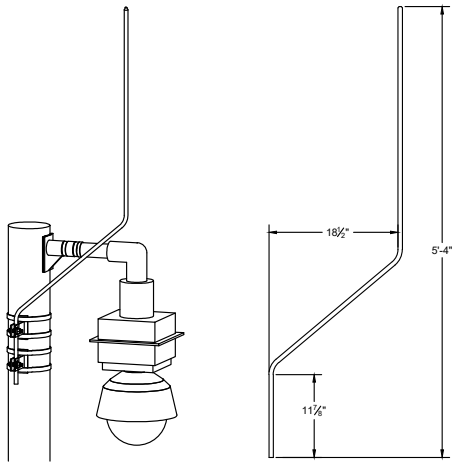
- Manufactured from 3/16" x 2" 304 stainless steel.
- Includes 3/8-16 stainless steel hardware.
- Can be mounted using stainless banding systems such as BAND-IT by others or by welding.
- Recommend using 2 per air terminal.
- Additional sizes available. Contact factory for more information.



CC TV Copper-Bonded Air Terminals

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
CCTVCCAT5/8	5/8"	5'-4"	7

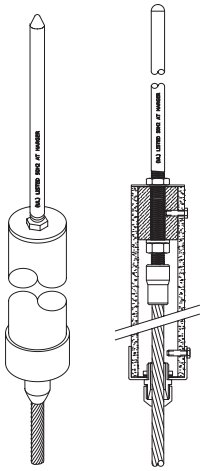
- For protecting security cameras mounted on poles.
- Manufactured from 5/8" copper-bonded ground rods.
- Additional sizes available. Contact factory for more information.



Air Terminal Assemblies

Copper Air Terminals with Fiberglass Mast Assembly

Part No.	Fiberglass Pipe Length (ft.)	Exposed Air Terminal Length (in.) (+/-1")	Conductor Type	Exposed Conductor Length (ft.)	Approx. Each Wt. (lbs.)
CUFATM-10	14	26	32	10	43
CUFATM-50	14	26	32	50	50
CUFATM-90	14	26	32	90	60
CUFATM20-5-15	20	60	28	15	45



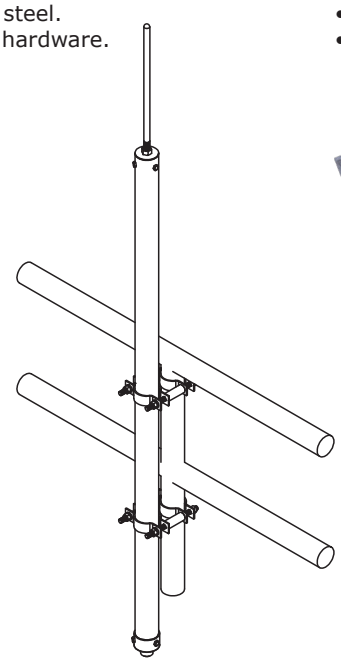
- Designed for use with towers or other structures which require long air terminal extensions.
- Protects tower lighting, antennas and miscellaneous equipment from direct lightning strikes.
- Copper lightning conductor is exothermically welded to the air terminal and extends past the end of the pole in various lengths.
- Mast is manufactured from heavy duty, rigid 1/4" thick fiberglass.
- Requires separate mounting assemblies such as SSATMSC2. Minimum of 2 per assembly.
- CUFATM20-5-15 ships partially assembled.
- Additional sizes available. Contact factory for more information.

Pipe Air Terminal Mast Assembly

Part No.	Qty.	Approx. Each Wt. (lbs.)
SSATMSC2	EA	1.5

- Mounts CUFATM assembly to vertical pole or tower platform.
- Mounts 2" mast to 2" OD tube.
- Manufactured from stainless steel.
- Includes 3/8" stainless steel hardware.

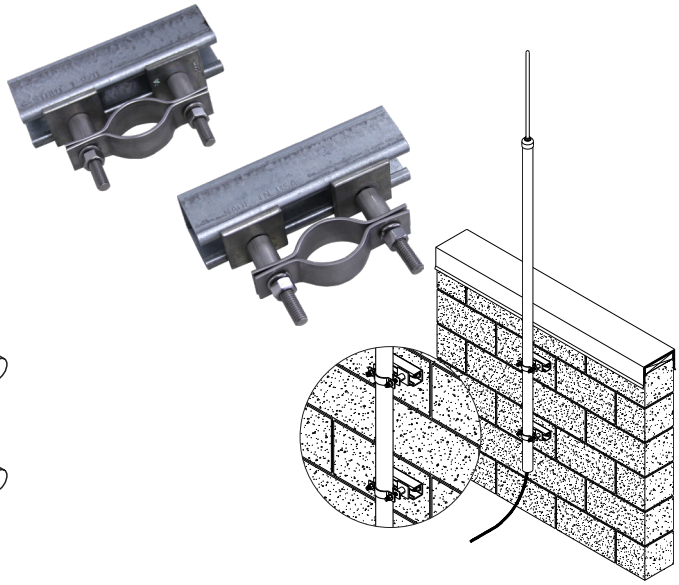




Wall Air Terminal Mast Assembly

Part No.	Qty.	Approx. Each Wt. (lbs.)
SSATMFSC2	EA	1.5

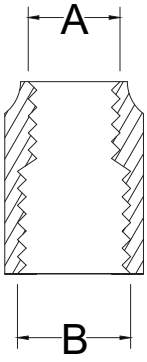
- Mounts CUFATM assembly to flat surfaces.
- Includes channel and spring-positioned mounting hardware.
- Manufactured from stainless steel.
- Two brackets included.
- Includes 3/8" stainless steel hardware.

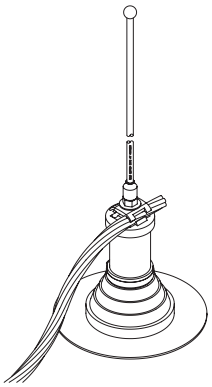


Air Terminal Adapters



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Standard

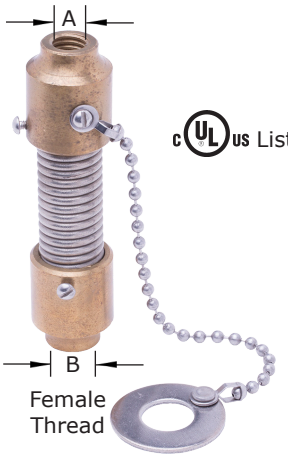
Part No.	Material	Thread Diameter		Approx. Each Wt. (lbs.)
		A	B	
120	Copper	3/8"	5/8"	0.1
120T	Tin Plated Copper	3/8"	5/8"	0.1
121	Copper	1/2"	5/8"	0.1
121T	Tin Plated Copper	1/2"	5/8"	0.1
A121	Aluminum	1/2"	5/8"	0.1
122	Copper	5/8"	5/8"	0.1
122T	Tin Plated Copper	5/8"	5/8"	0.1
122-5/8F1/2F	Copper	5/8"	1/2"	0.1
A122	Aluminum	5/8"	5/8"	0.1
A122-5/8F1/2F	Aluminum	5/8"	1/2"	0.1
123	Copper	3/8"	3/8"	0.1
123T	Tin Plated Copper	3/8"	3/8"	0.6
124	Copper	3/8"	1/2"	0.1
124T	Tin Plated Copper	3/8"	1/2"	0.1
125	Copper	1/2"	1/2"	0.1
125T	Tin Plated	1/2"	1/2"	0.1
A125	Aluminum	1/2"	1/2"	0.1

- Used to engage standard air terminal threads with different thread sizes found in various air terminal base assemblies. All threads are UNC.
- Nickel plated available.
- Additional sizes available. Contact factory for more information.

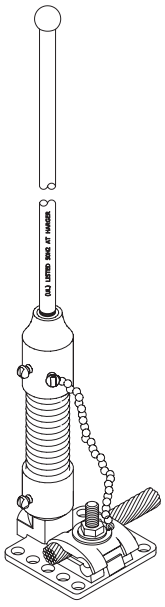
Air Terminal Adapters

Flexible Female Threads

Part No.	Material	Thread Diameter		Approx. Each Wt. (lbs.)
		A	B	
126	Copper	1/2"	5/8"	0.6
A126	Aluminum	1/2"	5/8"	0.4
127	Copper	1/2"	1/2"	0.7
A127	Aluminum	1/2"	1/2"	0.3
128	Copper	5/8"	5/8"	0.7
A128	Aluminum	5/8"	5/8"	0.4



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Flexible Male Threads

Part No.	Material	Thread Diameter		Approx. Each Wt. (lbs.)
		A	B	
127M	Copper	1/2"	1/2"	0.7
A127M	Aluminum	1/2"	1/2"	0.5
128M	Copper	5/8"	5/8"	0.7
A128M	Aluminum	5/8"	5/8"	0.4
129M	Copper	5/8"	1/2"	0.7
A129M	Aluminum	5/8"	1/2"	0.4



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NOTES:

- Not intended for use on air terminals over 18".
- Flexible air terminal adapters are used with air terminals located underneath window washing or other mobile equipment.
- Includes stainless steel spring and safety chain.
- Can be used in conjunction with safety tipped air terminals. See page 165.
- Additional sizes available. Contact factory for more information.

Air Terminal Adapters

Swivel

Part No.	Material	Thread Diameter		Approx. Each Wt. (lbs.)
		A	B	
133	Copper	3/8"	3/8"	0.4
133T	Tin Plated Copper	3/8"	3/8"	0.4
134	Copper	3/8"	1/2"	0.4
134T	Tin Plated Copper	3/8"	1/2"	0.4
135	Copper	3/8"	5/8"	0.4
135T	Tin Plated Copper	3/8"	5/8"	0.4
136	Copper	1/2"	1/2"	0.4
136T	Tin Plated Copper	1/2"	1/2"	0.4
A136	Aluminum	1/2"	1/2"	0.2
137	Copper	1/2"	5/8"	0.4
137T	Tin Plated Copper	1/2"	5/8"	0.4
A137	Aluminum	1/2"	5/8"	0.1
138	Copper	5/8"	5/8"	0.3
138T	Tin Plated Copper	5/8"	5/8"	0.4
A138	Aluminum	5/8"	5/8"	0.1
139	Copper	5/8"	1/2"	0.3
A139	Aluminum	5/8"	1/2"	0.1

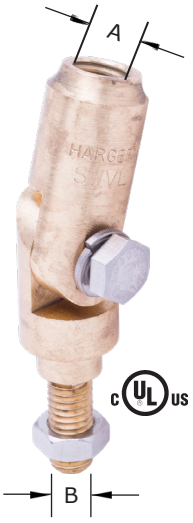


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- Used to plumb air terminals to vertical where the bases are mounted on sloping surfaces.
- Not intended to use on air terminals over 24" aluminum & 12" copper without additional support.
- Stainless steel screws allow the adapter to be locked in any position.

Swivel - CUSM & ALSM Series

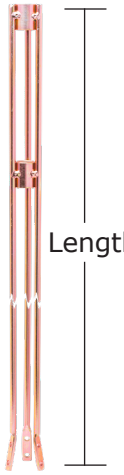
Part No.	Material	Internal Threaded Top A	Threaded Male Stud B	Approx. Each Wt. (lbs.)
CUS12M	Copper	1/2"	1/2"	0.5
CUS12MT	Tin Plated Copper	1/2"	1/2"	0.6
CUS38M	Copper	3/8"	3/8"	0.5
CUS38MT	Tin Plated Copper	3/8"	3/8"	0.5
CUS58M	Copper	5/8"	5/8"	0.5
CUS58MT	Tin Plated Copper	5/8"	5/8"	0.5
ALS12M	Aluminum	1/2"	1/2"	0.2
ALS58M	Aluminum	5/8"	5/8"	0.2



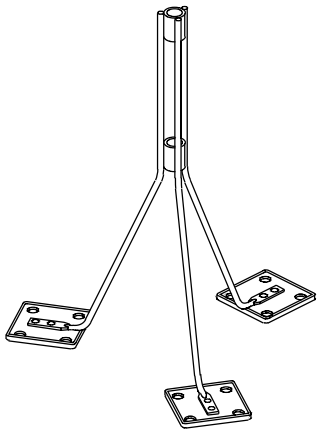
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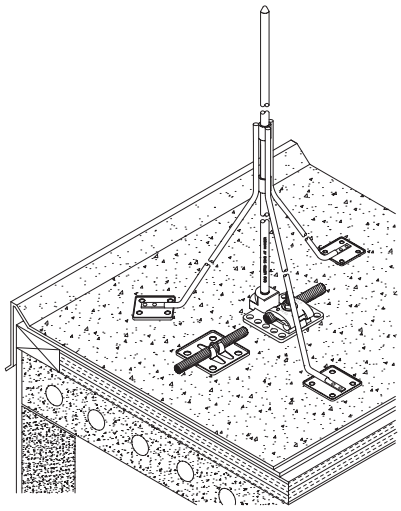
- Used to plumb air terminals to vertical where the bases are mounted on sloping surfaces.
- Not intended to use on air terminals over 24" aluminum & 12" copper without additional support.
- Stainless steel screws allow the adapter to be locked in any position.

Air Terminal Braces



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Part No.	Adhesive Feet Copper/Aluminum	Type	Length	Max. Air Terminal Supported	Approx. Each Wt. (lbs.)
140-18	-----	Screw Hole	18"	24"	0.1
140-18AD	Copper	Adhesive Feet	18"	24"	1.2
A140-18AD	Aluminum	Adhesive Feet	18"	24"	1.1
140-24	-----	Screw Hole	24"	36"	1.2
140-24AD	Copper	Adhesive Feet	24"	36"	1.3
A140-24AD	Aluminum	Adhesive Feet	24"	36"	1.7
140-36	-----	Screw Hole	36"	60"	1.7
140-36AD	Copper	Adhesive Feet	36"	60"	1.7
A140-36AD	Aluminum	Adhesive Feet	36"	60"	1.7
140-48	-----	Screw Hole	48"	72"	2.3
140-48AD	Copper	Adhesive Feet	48"	72"	2.3
A140-48AD	Aluminum	Adhesive Feet	48"	72"	2.2

- Tripod braces are used for the support of air terminals that exceed 24" in length.
- Constructed of 1/4" steel rod with welded joints and a zinc/ultraseal plating.
- Screw Hole braces available with 3/16" holes for anchoring with screws or nails. Install Adhesive Feet when mounting to roofing membranes or similar surfaces where penetrations cannot be made.
- Additional sizes available. Contact factory for more information.

TECHNICAL NOTE:

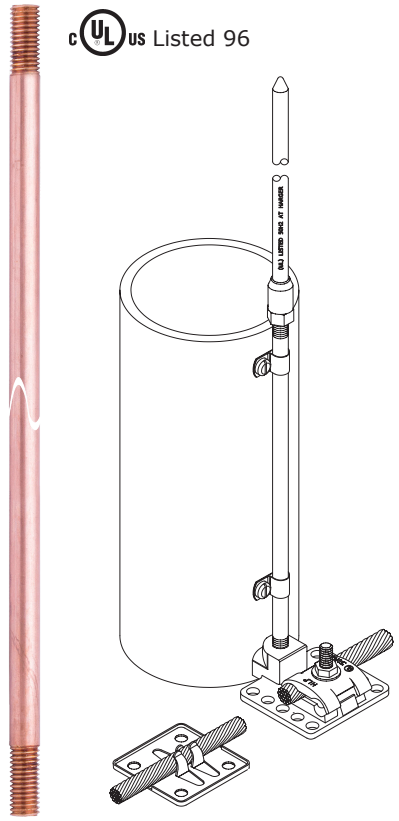
- Air terminals shall be secured against overturning or displacement by one of the following methods: (1) Attachment to the object to be protected (2) Braces that are permanently and rigidly attached to the structure. Air terminals exceeding 24 in (600 mm) in height shall be supported at a point not less than one-half their height.*

*NFPA 780 Air Terminal Support

Air Terminal Extensions

Part No.	Material	Length	Diameter	Approx. Each Wt. (lbs.)
144-12	Copper	12"	3/8"	0.4
144-24	Copper	24"	3/8"	0.9
144-36	Copper	36"	3/8"	1.3
144-48	Copper	48"	3/8"	1.7
145-12	Copper	12"	1/2"	0.8
A145-12	Aluminum	12"	1/2"	0.3
145-24	Copper	24"	1/2"	1.5
A145-24	Aluminum	24"	1/2"	0.5
145-36	Copper	36"	1/2"	2.5
A145-36	Aluminum	36"	1/2"	1
145-48	Copper	48"	1/2"	3
A145-48	Aluminum	48"	1/2"	0.9
146-12	Copper	12"	5/8"	1.2
A146-12	Aluminum	12"	5/8"	0.5
146-24	Copper	24"	5/8"	2.4
A146-24	Aluminum	24"	5/8"	0.7
146-36	Copper	36"	5/8"	3.6
A146-36	Aluminum	36"	5/8"	1.1
146-48	Copper	48"	5/8"	4.8
A146-48	Aluminum	48"	5/8"	1.4

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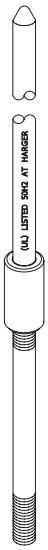


- Solid copper or aluminum extension rods are used to extend standard air terminals to lengths required.
- Extension rods are available in lengths up to 12 feet and have standard UNC threads at each end.
- Additional sizes available. Contact factory for more information.

Extension Rod Couplers

Part No.	Material	Internal Thread	Approx. Each Wt. (lbs.)
147	Copper	3/8"	0.3
148	Copper	1/2"	0.2
A148	Aluminum	1/2"	0.1
149	Copper	5/8"	0.2
A149	Aluminum	5/8"	0.1





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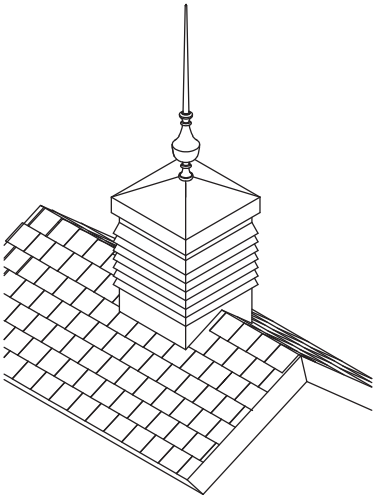
- 13/16" x 2" coupler connects air terminals to extension rods, or used to connect sections of rods together.
- All threads are UNC.

Decorative Finials

Decorative finial enhances building aesthetics while being part of a functional lightning protection system.

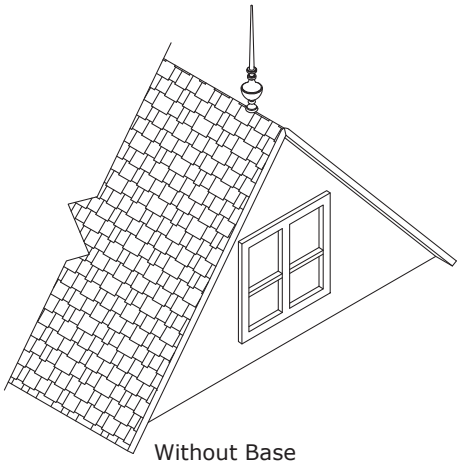


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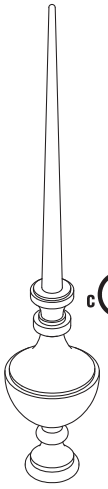


Part No.	Material	Approx. Each Wt. (lbs.)
BF16I1/2	Copper	3
ALF16I1/2	Aluminum	1

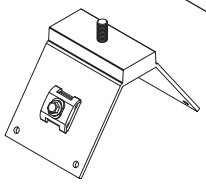
- 16" decorative finial with 1/2" diameter internal thread.

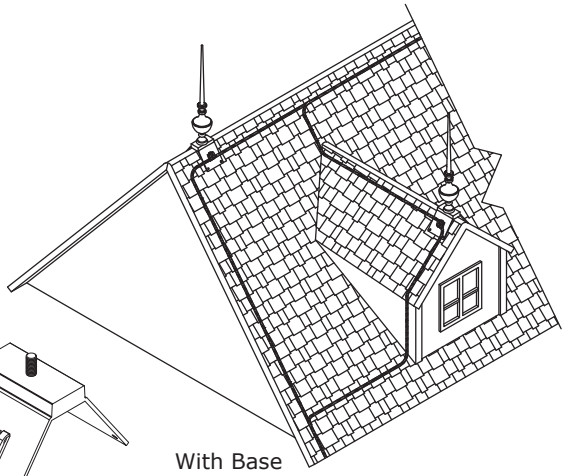


Without Base



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With Base

Part No.	Description	Material	Internal Thread	Approx. Each Wt. (lbs.)
BF27I1/2	Finial	Copper	1/2"	21
BF27BASE	Base	Copper	1/2"	19

- 27" decorative finial with 1/2" diameter internal thread.
- Base sold separately.

Air Terminal Bases

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Universal Stamped Air Terminal Bases	178
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Chimney Flue Bases	183
Dome Bases	184
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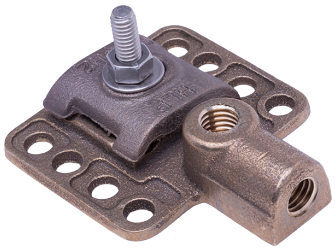
Universal Bases

Horizontal & Vertical Bases

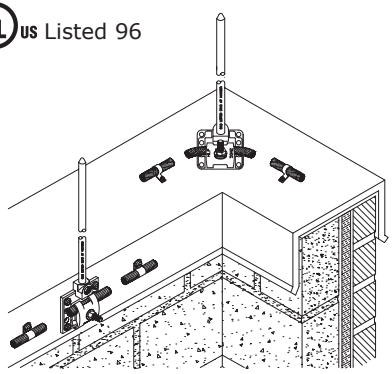
Part No.	Material	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
CUBU38I	Copper	3/8"	0.8
TCUBU38I	ETPB*	3/8"	0.9
CUBU12I	Copper	1/2"	0.8
TCUBU12I	ETPB*	1/2"	0.9
AUBU12I	Aluminum	1/2"	0.3
CUBU58I	Copper	5/8"	0.8
TCUBU58I	ETPB*	5/8"	0.9
AUBU58I	Aluminum	5/8"	0.3

- 2-5/8" x 3" 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.
- Accepts all Class I & Class II conductors.

*ETPB - Electro Tin Plated Bronze

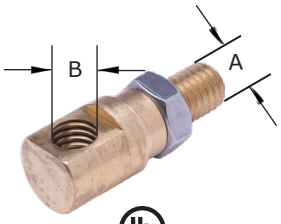


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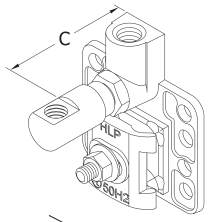


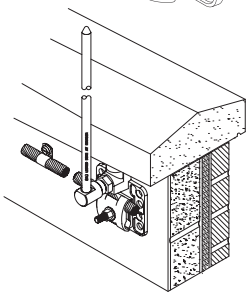
Parapet Base Extensions

Part No.	Material	Base Thread Diameter A	Air Terminal Threaded Diameter B	Offset Clearance C	Approx. Each Wt. (lbs.)
BPBE2	Copper	1/2"	1/2"	2"	0.5
BPBE2-3/8	Copper	1/2"	3/8"	2"	0.5
BPBE2-3/8X3/8	Copper	3/8"	3/8"	2"	0.5
BPBE2-5/8X5/8	Copper	5/8"	5/8"	2"	0.5
BPBE3	Copper	1/2"	1/2"	3"	0.6
BPBE3-3/8	Copper	1/2"	3/8"	3"	0.6
BPBE3-3/8X3/8	Copper	3/8"	3/8"	3"	0.6
BPBE3-5/8X5/8	Copper	5/8"	5/8"	3"	0.6
APBE2	Aluminum	1/2"	1/2"	2"	0.2
APBE2-5/8	Aluminum	1/2"	5/8"	2"	0.1
APBE2-5/8X5/8	Aluminum	5/8"	5/8"	2"	0.2
APBE3	Aluminum	1/2"	1/2"	3"	0.2
APBE3-5/8X5/8	Aluminum	5/8"	5/8"	3"	0.2



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- Used when mounting air terminal bases under copings up to a 2" or 3" overhang.
- Provides a 2" or 3" extension (measured from inside of air terminal to parapet wall).
- Manufactured from highly conductive copper or aluminum alloys.
- Stainless steel jam nut provides for proper positioning of air terminal.
- Available electro-tin plated. When ordering, add prefix "T" to part number.

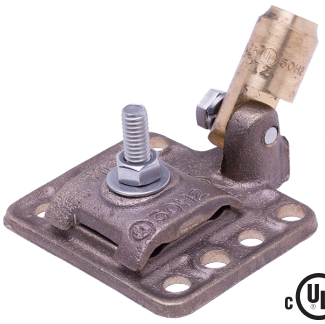
Swivel Bases

Swivel Adapter Bases

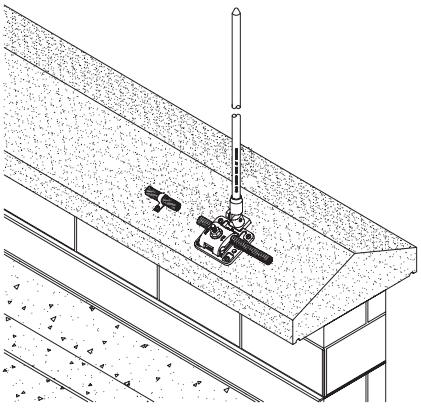
Part No.	Material	Internally Thread Hub Diameter	Approx. Each Wt. (lbs.)
CUBS38	Copper	3/8"	1
TCUBS38	ETPB*	3/8"	1
CUBS12	Copper	1/2"	1
TCUBS12	ETPB*	1/2"	1
AUBS12	Aluminum	1/2"	0.4
CUBS58	Copper	5/8"	1
TCUBS58	ETPB*	5/8"	0.9
AUBS58	Aluminum	5/8"	0.3

- 2-5/8" x 3" base features a swivel adapter intended for installation on slopped surfaces.
- Utilizes a variety of mounting applications such as self tapping screws, nails or adhesives.
- Accepts all Class I & Class II conductors.

*ETPB - Electro Tin Plated Bronze



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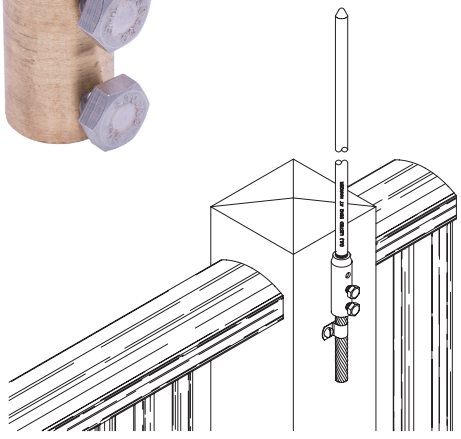
Vertical Bases

Part No.	Material	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
157	Copper	3/8"	0.3
157T	Tinned Brass	3/8"	0.3
158	Copper	1/2"	0.2
158T	Tinned Brass	1/2"	0.3
A158R	Aluminum	1/2"	0.2
158-5/8	Copper	5/8"	0.3
158-5/8T	Tinned Brass	5/8"	0.3
A158R-5/8	Aluminum	5/8"	0.1

- 2-1/2" long, vertical base connector features 1/4" mounting hole and two stainless steel cap screws to assure a good electrical connection.
- For all standard cables up to 1/2" in diameter.
- A158R and A158R-5/8 fits aluminum cables up to 19/32" diameter.



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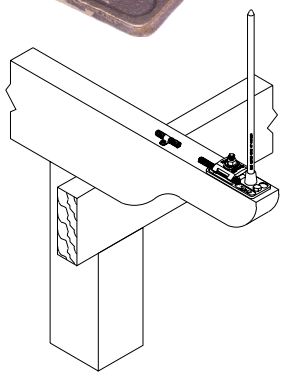
Horizontal Bases

Narrow Internally Threaded Hub Bases

Part No.	Material	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
15138I	Copper	3/8"	0.7
15138IT	ETPB*	3/8"	0.7
15112I	Copper	1/2"	0.7
15112IT	ETPB*	1/2"	0.7
A15112I	Aluminum	1/2"	0.2
15158I	Copper	5/8"	0.7
15158IT	ETPB*	5/8"	0.7
A15158I	Aluminum	5/8"	0.2



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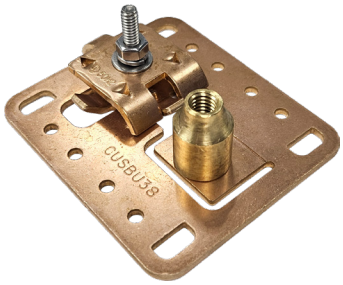


- 1-3/4" x 4" base is ideal for use where mounting area is limited.
- Accepts all Class I & Class II conductors.
- Two mounting holes are provided for secure mounting using machine or self tapping screws.

*ETPB - Electro Tin Plated Bronze

Universal Stamped Air Terminal Bases

Part No.	Material	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
CUSBU38	Copper	3/8"	0.9
CUSBU12	Copper	1/2"	0.8
AUSBU12	Aluminum	1/2"	0.2
CUSBU58	Copper	5/8"	0.8
AUSBU58	Aluminum	5/8"	0.2



- 3.5" x 4" base features an adjustable design allowing it to cover horizontally, vertically or sloped requirements.
- 0.56" corner slots allow the base to be strap mounted to horizontal or vertical pipes.
- Accepts all Class I & Class II conductors.
- Can be mounted with self tapping screws, nails, or adhesive.

TECHNICAL NOTES:

- A threaded hub provided for the attachment of the air terminal shall have at least five full threads and, if internally threaded, shall have a wall thickness of not less than 1/16 in (1.6 mm) measured at the base of the threads.*
- Each base support shall incorporate a connector fitting for connection to the lightning conductor. The conducting cross-sectional area of the base support, between the connector and the base of the air terminal, shall be equal to or greater than that of the conductor. The conductor shall contact the base for not less than 1-1/2 in (38 mm) on all sides of the cable.*
- At least two mounting holes that will accept a No. 10 - 24 or larger bolt or screw shall be provided in the support so that it can be permanently and rigidly fastened.*

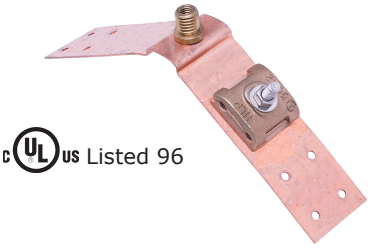
*UL 96 Standard for Lightning Protection Components Sections 7.2, 7.4 & 7.5

Ridge Saddle Bases

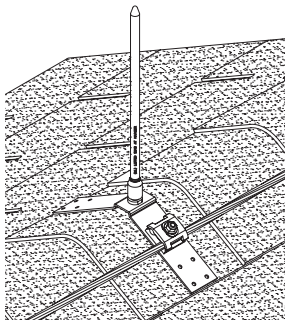
Part No.	Material	Threaded Hub Diameter		Approx. Each Wt. (lbs.)
		Int.	Ext.	
160	Copper	3/8"	5/8"	1
160T	ETPB*	3/8"	5/8"	1
A160	Aluminum	1/2"	N/A	0.5
A160-5/8	Aluminum	5/8"	N/A	0.5

- 2" x 12" base fits easily to most any surface.
- Accepts all Class I & Class II conductors.

*Electro Tin Plated



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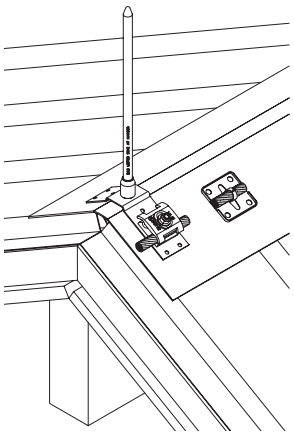
1/2 Ridge Saddle Bases

Part No.	Material	Threaded Hub Diameter		Approx. Each Wt. (lbs.)
		Int.	Ext.	
CURS6.75	Copper	3/8"	5/8"	0.9
ALRS6.75	Aluminum	1/2"	N/A	0.3

- 2" x 6-3/4" base fits easily to most any surface.
- Accepts all Class I & Class II conductors.



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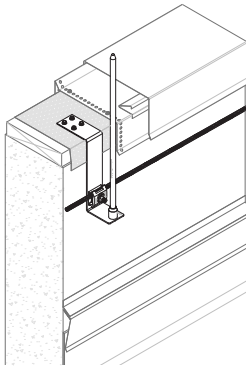
Concealed Coping Bases

Part No.	Material	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
CCCB38	Copper	3/8"	1.2
ACCB12	Aluminum	1/2"	0.5
CCCB12SS*	Copper	1/2"	1.2
ACCB58	Aluminum	5/8"	0.5

- Mounts under coping.
- Accepts all Class I & Class II conductors.

* Stainless Steel bracket

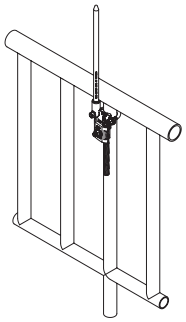




Pipe Railing Bases

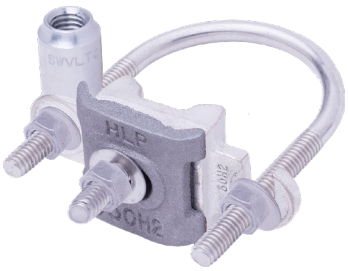


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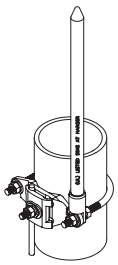


Part No.	Material	Nominal Pipe Size Range	Outside Diameter Range	Air Terminal Diameter	Approx. Each Wt. (lbs.)
CPRB.5/1AT38	ETPB*	.5" - 1"	0.84" - 1.315"	3/8"	0.8
CPRB.5/1AT12	ETPB*	.5" - 1"	0.84" - 1.315"	1/2"	0.8
CPRB.5/1AT58	ETPB*	.5" - 1"	0.84" - 1.315"	5/8"	0.8
APRB.5/1AT12	Aluminum	.5" - 1"	0.84" - 1.315"	1/2"	0.5
APRB.5/1AT58	Aluminum	.5" - 1"	0.84" - 1.315"	5/8"	0.4

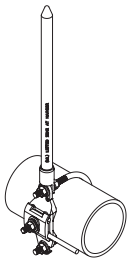
* Electro Tin Plated Bronze



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Vertical



Horizontal

Part No.	Material	Nominal Pipe Size Range	Outside Diameter Range	Air Terminal Diameter	Approx. Each Wt. (lbs.)
CPRB1.5/2AT38	ETPB*	1.25" - 2"	1.315" - 2.4"	3/8"	1
CPRB1.5/2AT12	ETPB*	1.25" - 2"	1.315" - 2.4"	1/2"	1
CPRB1.5/2AT58	ETPB*	1.25" - 2"	1.315" - 2.4"	5/8"	0.1
APRB1.5/2AT12	Aluminum	1.25" - 2"	1.315" - 2.4"	1/2"	0.5
APRB1.5/2AT58	Aluminum	1.25" - 2"	1.315" - 2.4"	5/8"	0.4
CPRB2.5/3AT38	ETPB*	2.5" - 3"	2.25" - 3.5"	3/8"	1.4
CPRB2.5/3AT12	ETPB*	2.5" - 3"	2.25" - 3.5"	1/2"	1.4
CPRB2.5/3AT58	ETPB*	2.5" - 3"	2.25" - 3.5"	5/8"	1.4
APRB2.5/3AT12	Aluminum	2.5" - 3"	2.25" - 3.5"	1/2"	0.5
APRB2.5/3AT58	Aluminum	2.5" - 3"	2.25" - 3.5"	5/8"	0.6

* Electro Tin Plated Bronze

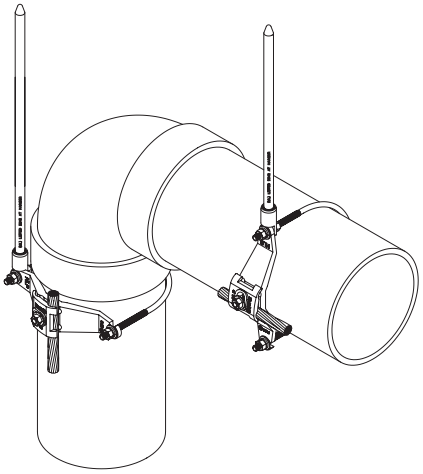
NOTES:

- Pipe Railing Bases are designed to fit Nominal Pipe Sizes provided, actual installation range detailed in "Outside Diameter Range".
- Not intended for use on air terminals over 24" aluminum & 12" copper without additional support.
- Swivel adapter design allows for mounting at any angle.
- Accepts all Class I & Class II conductors.

Pipe Railing Bases



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Part No.	Material	Nominal Pipe Size Range	Outside Diameter Range	Air Terminal Diameter	Approx. Each Wt. (lbs.)
CPRB3.5/4AT38	ETPB*	3.5" - 4"	3.2" - 4.50"	3/8"	1.3
CPRB3.5/4AT12	ETPB*	3.5" - 4"	3.2" - 4.50"	1/2"	1.5
CPRB3.5/4AT58	ETPB*	3.5" - 4"	3.2" - 4.50"	5/8"	1.3
APRB3.5/4AT12	Aluminum	3.5" - 4"	3.2" - 4.50"	1/2"	0.8
APRB3.5/4AT58	Aluminum	3.5" - 4"	3.2" - 4.50"	5/8"	0.8
CPRB5/6AT38	ETPB*	5" - 6"	5.63" - 6.63"	3/8"	1.9
CPRB5/6AT12	ETPB*	5" - 6"	5.63" - 6.63"	1/2"	1.9
CPRB5/6AT58	ETPB*	5" - 6"	5.63" - 6.63"	5/8"	1.9
APRB5/6AT12	Aluminum	5" - 6"	5.63" - 6.63"	1/2"	1.2
APRB5/6AT58	Aluminum	5" - 6"	5.63" - 6.63"	5/8"	1.2

* Electro Tin Plated Bronze

NOTES:

- Pipe Railing Bases are designed to fit Nominal Pipe Sizes provided, actual installation range detailed in "Outside Diameter Range".
- Not intended for use on air terminals over 24" aluminum & 12" copper without additional support.
- Swivel adapter design allows for mounting at any angle.
- Accepts all Class I & Class II conductors.

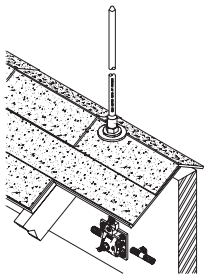
Concealed Bases

Concealed Base Assemblies

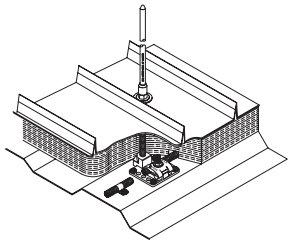
Part No.	Material	Riser Bar Length	Riser Bar Diameter	Approx. Box Wt. (lbs.)
156-6	Copper	6"	1/2"	1
A156-6	Aluminum	6"	1/2"	0.6
156BM-6	Bi-Metal	6"	1/2"	1.1
156-12	Copper	12"	1/2"	1
A156-12	Aluminum	12"	1/2"	0.1
156BM-12	Bi-Metal	12"	1/2"	1.7
156-18	Copper	18"	1/2"	1.3
A156-18	Aluminum	18"	1/2"	1.1
156BM-18	Bi-Metal	18"	1/2"	1.7

- Concealed Base Assemblies are designed to be mounted vertically or horizontally. Vertically on ridge boards or roof trusses or horizontally on flat roof decks or other flat surfaces.





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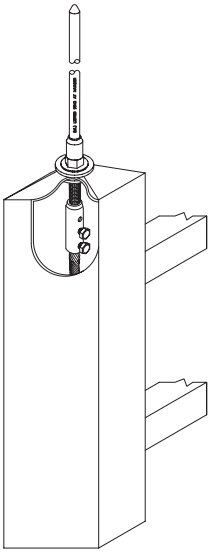


Concealed Base Assemblies

Part No.	Material	Riser Bar Length	Riser Bar Diameter	Approx. Each Wt. (lbs.)
158-6	Copper	6"	1/2"	0.6
158BM-6	Bi-Metal	6"	1/2"	0.8
158-12	Copper	12"	1/2"	0.8
158BM-12	Bi-Metal	12"	1/2"	1.5
158-18	Copper	18"	1/2"	1.2
158BM-18	Bi-Metal	18"	1/2"	2.2
A158-6	Aluminum	6"	1/2"	0.3
A158-12	Aluminum	12"	1/2"	0.8
A158-18	Aluminum	18"	1/2"	1.1

- Aluminum concealed base assemblies utilize stainless steel riser bars.





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NOTES:

- Accepts all Class I and Class II conductors.
- Stainless steel jam nut and washer are provided along with a special neoprene sealing washer to assure a watertight installation.
- Bi-metal consists of stainless steel riser bar and bronze base.
- Air terminal adapters needed for these type of bases. See page 169 for adapters.
- Additional lengths available. Contact factory for more information.

Concealed Bases

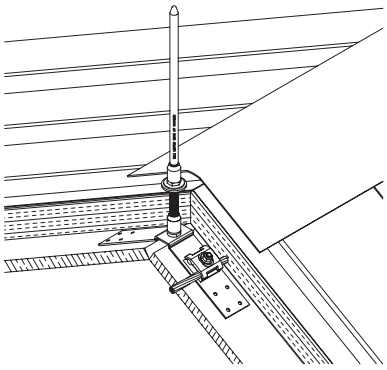
Concealed Ridge Saddle Assemblies

Part No.	Material	Riser Bar Length	Riser Bar Diameter	Approx. Each Wt. (lbs.)
162-6	Copper	6"	1/2"	1.3
A162-6	Aluminum	6"	1/2"	0.7
162-12	Copper	12"	1/2"	1.4
A162-12	Aluminum	12"	1/2"	0.8
162-18	Copper	18"	1/2"	1.8
A162-18	Aluminum	18"	1/2"	1.4

- 2" x 12" concealed base assembly designed for use on pitched roof decks in the insulation space.
- Permits concealment of roof conductors where they otherwise may not be concealed because the under side of the deck is exposed.
- Accepts all Class I & Class II conductors.
- Furnished with a stainless steel washer and jam nut, as well as a neoprene washer for a watertight installation.



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NOTES:
- Air terminal adapters needed for these type of bases. See page 175 for adapters.
- For other available riser bar lengths, contact factory for more information.

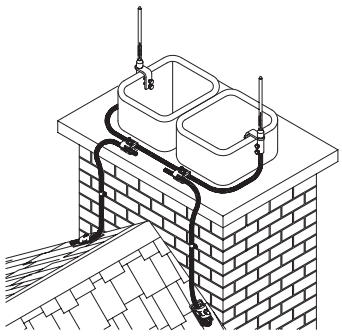
Chimney Flue Bases

Part No.	Material	Maximum Material Thickness	Class	Internally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
CFB1.5	Tinned Copper	1-1/2"	I	3/8"	1.1
CFB2.25	Tinned Copper	2-1/4"	I	3/8"	1.2
AFB1-1/2	Aluminum	1"	I	1/2"	0.4
AFB1-5/8	Aluminum	1"	II	5/8"	0.4

- Accepts all Class I & Class II conductors.
- Used when protecting chimneys from direct lightning strikes.
- Additional sizes available. Contact factory for more information.



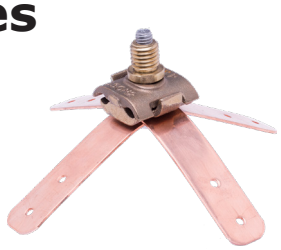
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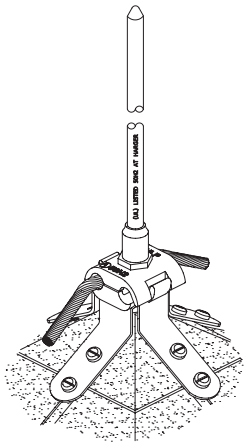
Dome Bases

Part No.	Material	Externally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
164	Copper	5/8"	0.8
A164	Aluminum	5/8"	0.4

- Base features four 4" straps with two 3/16" mounting holes per strap.
- Straps manufactured from 1" wide soft temper copper or aluminum which easily forms to fit all conical shapes.
- Accepts all Class I & Class II conductors.



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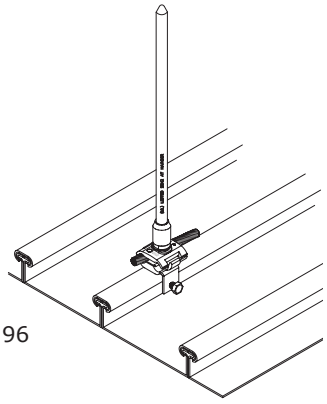
Standing Seam Bases

Part No.	Material	Externally Threaded Hub Diameter	Approx. Each Wt. (lbs.)
BSB	Copper	5/8"	0.6
ALSB	Aluminum	5/8"	0.4

- Used to connect air terminal and conductor to a seam.
- Fits up to 1" wide seam.
- Omni directional base design allows conductor to be coursed parallel or perpendicular to seam.
- Accepts all Class I & Class II conductors.



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NOTES:
- Air terminal adapters needed for these type of bases. See page 169 for adapters.

Thru-Roof/Wall Assemblies & Accessories

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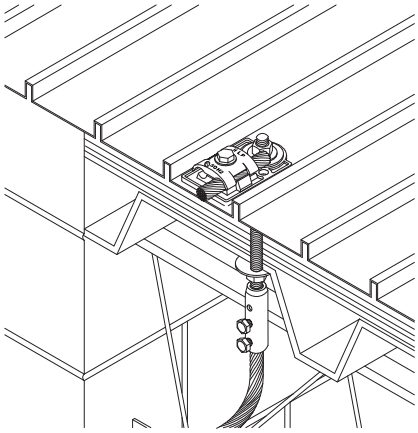
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Thru-Roof/Wall Assemblies



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Right Angle to Straight Connection

Part No.	Type of Material		Threaded Bar Length	Approx. Each Wt. (lbs.)
	A	B		
225-6	Copper	Copper	6"	1.2
A2256	Aluminum	Aluminum	6"	0.6
225BM6	Aluminum	Copper	6"	1.1
225-12	Copper	Copper	12"	1.4
A22512	Aluminum	Aluminum	12"	0.9
225BM12	Aluminum	Copper	12"	1.3
225-18	Copper	Copper	18"	1.8
A22518	Aluminum	Aluminum	18"	1.2
225BM18	Aluminum	Copper	18"	1.6
A225BM18	Copper	Aluminum	18"	1.7

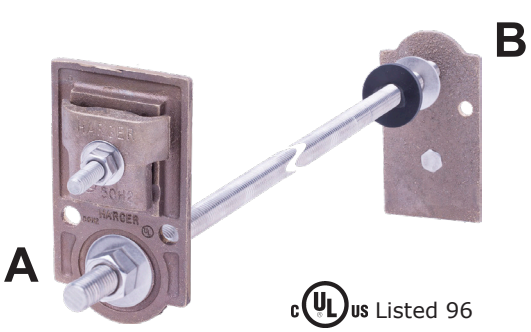
- Thru-roof or thru-wall connectors are used when making roof or wall penetrations because of the difficulty of sealing stranded lightning conductor cables.
- Features include 1/2" diameter threaded rod, neoprene sealing washers and stainless steel jam nuts to assure a watertight installation.
- Accepts all Class I & Class II conductors.
- Additional configurations available. Contact factory for more information.

TECHNICAL NOTES:

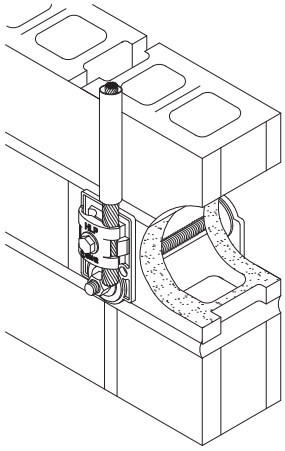
- Requirements covering exposed systems also shall apply to concealed systems, except conductors shall be permitted to be coursed under roofing materials, under roof framing, behind exterior wall facing, between wall studding, in conduit chases, or embedded directly in concrete or masonry construction.*
- Where a conductor is run in metal conduit, it shall be bonded to the conduit at the point where it enters the conduit, at the point where it emerges from the conduit, and at all locations where the conduit is not electrically continuous.*

*NFPA 780 Concealed Systems, General

Thru-Roof/Wall Assemblies



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Right Angle to Right Angle Connection

Part No.	Type of Material		Threaded Bar Length	Approx. Each Wt. (lbs.)
	A	B		
226-6	Copper	Copper	6"	1.7
A2266	Aluminum	Aluminum	6"	0.9
226BM6	Copper	Aluminum	6"	1.3
226-12	Copper	Copper	12"	2
A22612	Aluminum	Aluminum	12"	1.1
226BM12	Copper	Aluminum	12"	1.5
226-18	Copper	Copper	18"	2.2
A22618	Aluminum	Aluminum	18"	1.4
226BM18	Copper	Aluminum	18"	1.8

- Thru-roof or thru-wall connectors are used when making roof or wall penetrations because of the difficulty of sealing stranded lightning conductor cables.
- Features include 1/2" diameter threaded rod, neoprene sealing washers and stainless steel jam nuts to assure a watertight installation.
- Accepts all Class I & Class II conductors.
- Additional configurations available. Contact factory for more information.

TECHNICAL NOTES:

- Requirements covering exposed systems also shall apply to concealed systems, except conductors shall be permitted to be coursed under roofing materials, under roof framing, behind exterior wall facing, between wall studding, in conduit chases, or embedded directly in concrete or masonry construction.*
- Where a conductor is run in metal conduit, it shall be bonded to the conduit at the point where it enters the conduit, at the point where it emerges from the conduit, and at all locations where the conduit is not electrically continuous.*

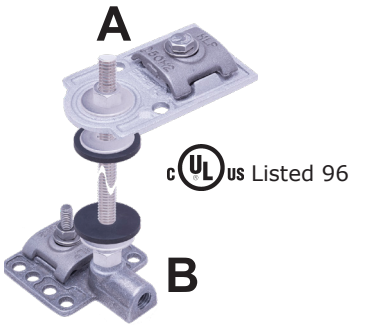
*NFPA 780 Concealed Systems, General

Thru-Roof/Wall Assemblies

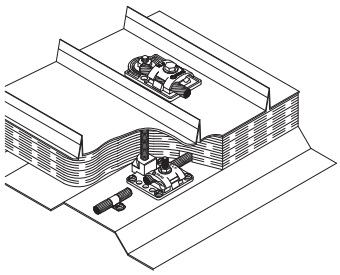
Horizontal to Flat Surface Thru-Roof

Part No.	Type of Material		Threaded Bar Length	Approx. Each Wt. (lbs.)
	A	B		
U219ATR-6	Aluminum	Aluminum	6"	0.9
U219BMTR-6	Aluminum	Copper	6"	1.5
U219TR-6	Copper	Copper	6"	1.8
U219ATR-12	Aluminum	Aluminum	12"	1.1
U219BMTR-12	Aluminum	Copper	12"	1.8
U219TR-12	Copper	Copper	12"	2.1

- Thru-roof or thru-wall connectors are used when making roof or wall penetrations because of the difficulty of sealing stranded lightning conductor cables.
- Features include 1/2" diameter threaded rod, neoprene sealing washers and stainless steel jam nuts to assure a watertight installation.
- Accepts all Class I & Class II conductors.
- Additional sizes available. Contact factory for more information.



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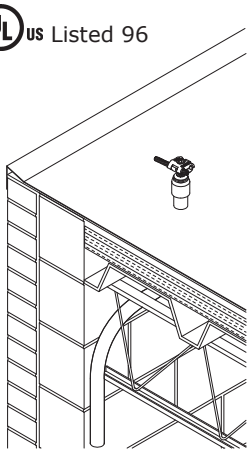
Low Profile Thru-Roof

Part No.	Type of Material		Approx. Each Wt. (lbs.)
	A	B	
ATRC1	Aluminum	Aluminum	0.5
CTRC1	Copper	Copper	1
BMTRC1	Aluminum	Copper	0.8
BMTRC1U	Bi-Metal	Copper	1

- Low profile assembly provides a watertight mechanical connection through the roof when 1" Schedule 40 PVC.
- Used when 230 series thru-roof units are not feasible.
- BMTRC1 thru-roof connectors provide a bi-metal connection between aluminum roof components and copper down conductors.
- BMTRC1U thru-roof connector provides a universal connection for one aluminum and/or one copper roof component and a copper down conductor.
- Accepts all Class I & Class II conductors.



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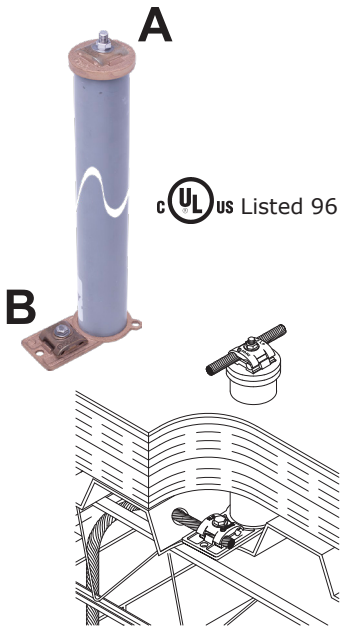
Bi-Metal

Thru-Roof/Wall Assemblies

Horizontal Base Thru-Roof

Part No.	Type of Material		Riser Length	Approx. Each Wt. (lbs.)
	A	B		
230H12	Copper	Copper	12"	2.9
230H18	Copper	Copper	18"	3.6
230H24	Copper	Copper	24"	4.5
230HBM12	Aluminum	Copper	12"	2
230HBM18	Aluminum	Copper	18"	2.6
230HBM24	Aluminum	Copper	24"	3.3

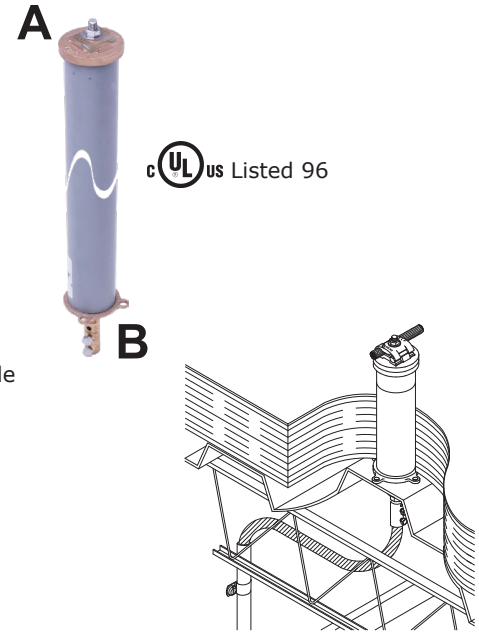
- No. 230 series thru-roof assemblies offer strength and are compatible with a wide range of roofing systems.
- Assemblies feature a 2-3/8" O.D. PVC tubing support.
- Provides additional strength to protect against breakage and presents a smooth, rigid surface for the installation of various types of membrane boot flashings.
- Accepts all Class I & Class II conductors.
- Additional sizes available. Contact factory for more information.



Vertical Base Thru-Roof

Part No.	Type of Material		Riser Length	Approx. Each Wt. (lbs.)
	A	B		
230V12	Copper	Copper	12"	2.7
230V18	Copper	Copper	18"	3.1
230V24	Copper	Copper	24"	3.7
230VBM12	Aluminum	Copper	12"	1.8
230VBM18	Aluminum	Copper	18"	2.3
230VBM24	Aluminum	Copper	24"	4

- No. 230 series thru-roof assemblies offer strength and are compatible with a wide range of roofing systems.
- Assemblies feature a 2-3/8" O.D. PVC tubing support.
- Provides additional strength to protect against breakage and presents a smooth, rigid surface for the installation of various types of membrane boot flashings.
- Accepts all Class I & Class II conductors.
- Additional sizes available. Contact factory for more information.



Thru-Roof Assemblies

Stainless Steel Thru-Roof Assemblies

Stainless Steel In Line Splice

Part No.	Type of Material		Riser Length	Approx. Each Wt. (lbs.)
	A	B		
SSTRCC15812	Copper	Copper	12"	0.8
SSTRCC15824	Copper	Copper	24"	2.3
SSTRACBM15812	Aluminum	Copper	12"	1.6
SSTRACBM15824	Aluminum	Copper	24"	1.9



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Stainless Steel Parallel Splice

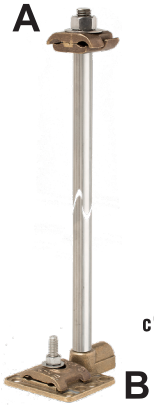
Part No.	Type of Material		Riser Length	Approx. Each Wt. (lbs.)
	A	B		
SSTRCCB1BC12	Copper	Copper	12"	1.7
SSTRCCB1BC24	Copper	Copper	24"	2.5
SSTRACBMB1BC12	Aluminum	Copper	12"	1.5
SSTRACBMB1BC24	Aluminum	Copper	24"	2.2



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Stainless Steel Air Terminal Base

Part No.	Type of Material		Riser Length	Approx. Each Wt. (lbs.)
	A	B		
SSTRCCCUBU12	Copper	Copper	12"	1.9
SSTRCCCUBU24	Copper	Copper	24"	2.6
SSTRACBMCUBU12	Aluminum	Copper	12"	1.6
SSTRACBMCUBU24	Aluminum	Copper	24"	2.3



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NOTE:
- Non-flammable, watertight penetration for a lightning protection system.
- Various roofing boots that are designed for 5/8" diameter penetrations can be used to create a weatherproof seal.

Thru-Roof Accessories

Cap & Cable Connectors

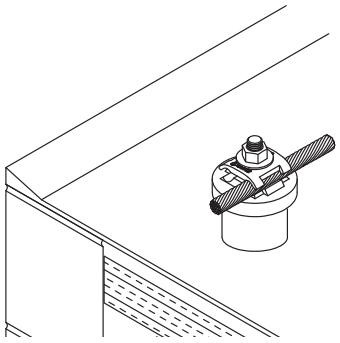
Part No.	Material	Approx. Each Wt. (lbs.)
244	Copper	0.8
A244	Aluminum	0.2
244T	ETPB*	0.8

- Special fitting designed to fit standard 2" schedule 40 PVC pipe.
- Ensures a water resistant joint when appropriate sealant is used (See page 159).
- Cable clamp accepts up to two Class II conductors.
- Center hub has 1/2" x 13 thread to fit standard 1/2" riser bars.

*ETPB - Electro Tin Plated Bronze



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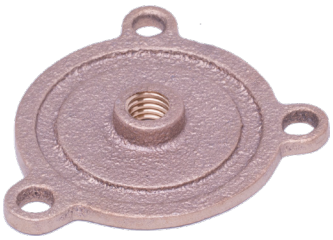


Base Plates

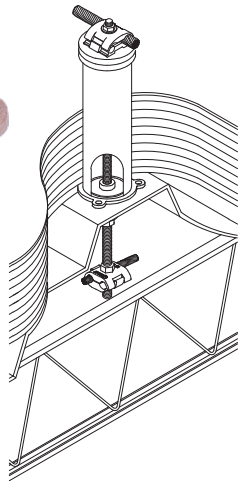
Part No.	Material	Approx. Each Wt. (lbs.)
245	Copper	1
A245	Aluminum	0.1
245T	ETPB*	0.4

- Heavy duty base plate designed for use with standard 2" schedule 40 PVC pipe.
- Three mounting holes permit secure mounting to roof decks.
- May be used on top of or below concrete or metal roof decks.
- Center hub is threaded for 1/2" x 13 standard riser bar.
- Recessed ring is provided to seat PVC pipe and to assure a rigid assembly.
- 1/4" mounting holes.

*ETPB - Electro Tin Plated Bronze



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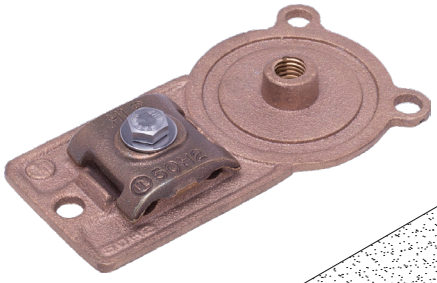


Base Plates / Cable Connectors

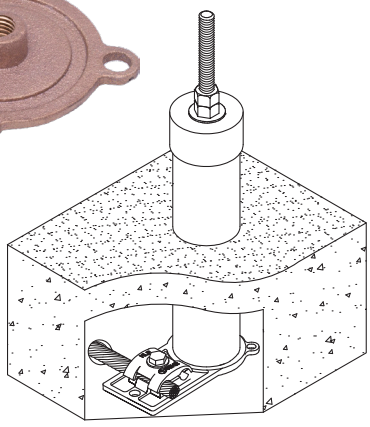
Part No.	Material	Approx. Each Wt. (lbs.)
246	Copper	0.9
A246	Aluminum	0.3
246T	ETPB*	0.9

- Combination base plate and cable connector engineered to provide easy, secure mounting to any roof deck.
- Accepts all Class I & Class II conductors.
- Three mounting holes assure secure mounting.

*ETPB - Electro Tin Plated Bronze



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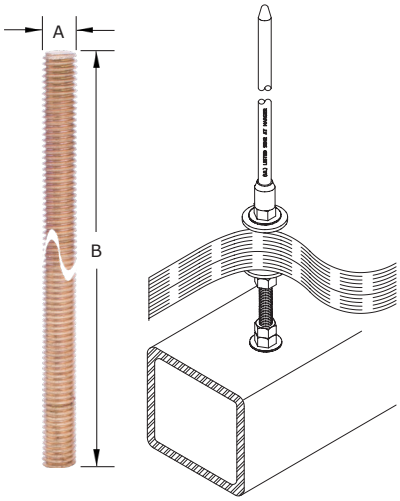


Thru-Roof Accessories

Threaded Riser Bar

Part No.	Material	"A"	"B"	Approx. Each Wt. (lbs.)
240-6	Copper	3/8"	6"	0.2
240-12	Copper	3/8"	12"	0.3
240-24	Copper	3/8"	24"	0.6
241-6	Copper	1/2"	6"	0.3
241S6	Stainless Steel	1/2"	6"	0.3
241-12	Copper	1/2"	12"	0.6
241S12	Stainless Steel	1/2"	12"	0.5
241-24	Copper	1/2"	24"	1.1
241S24	Stainless Steel	1/2"	24"	1

• High quality threaded riser bar can be furnished in any length up to 6 feet.



Neoprene Washers

Part No.	Bolt Hole Size	Outside Diameter	Pieces Per Part No.
W6R-50	3/8"	1-3/8"	50
W6R-100	3/8"	1-3/8"	100
W8R-50	1/2"	1-3/8"	50
W8R-100	1/2"	1-3/8"	100



Lightning Conductor Connectors

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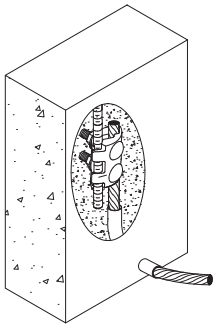
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Cable to Flat Metal Connectors	198
Sillcock Ground Connector	199
Strap Type Pipe Clamps	199
CPC & APC Pipe Clamps	200

2 Bolt Parallel Connectors

Part No.	Material	Class	Approx. Each Wt. (lbs.)
204	Copper	II	0.4
A204	Aluminum	II	0.2
204T	ETPB*	II	0.4



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- Approximately 2" x 1-3/4" two piece connector used for splicing cables and rods.
- Accepts all Class I & Class II conductors.
- Accommodates ground cable sizes ranging from #6 AWG up to 250 MCM.
- 5/16" x 1-3/4" stainless steel carriage bolts, flat washers and nuts included.
- Recommended installation tool - 1/2" deep socket wrench, end wrench or nut driver.
- 204 & 204T are suitable for direct burial in earth & concrete.

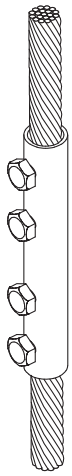
*ETPB - Electro Tin Plated Bronze

4 Bolt Connectors

Part No.	Material	Class	Approx. Each Wt. (lbs.)
205	Copper	II	0.5
A205R	Aluminum	II	0.3
205T	Copper*	II	0.5



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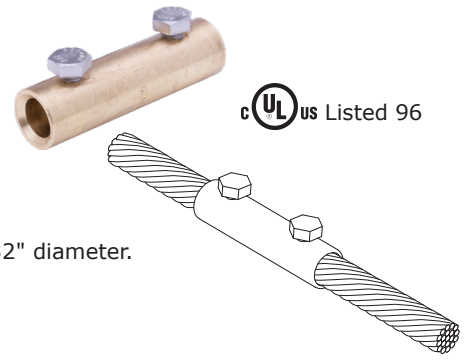


- Approximately 4" long connector provides 2" of surface contact between conductors.
- Accepts all Class I & Class II conductors.
- A205R accommodates all standard size Class I and Class II conductors up to 19/32" diameter.
- Four 5/16" hex head stainless steel cap screws assure a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

*Electro Tin Plated

2 Bolt Connectors

Part No.	Material	Class	Approx. Each Wt. (lbs.)
206	Copper	II	0.3
A206R	Aluminum	II	0.2
206T	Copper*	II	0.3



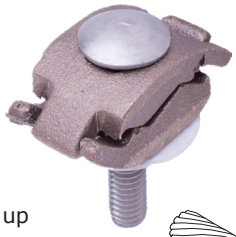
c UL us Listed 96

- 3" long connector provides 1-1/2" of surface contact between conductors.
- Accepts all Class I & Class II conductors.
- A206R accommodates all standard size Class I and Class II conductors up to 19/32" diameter.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

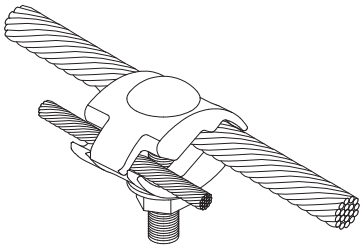
*Electro Tin Plated

1 Bolt Bonding Connectors

Part No.	Material	Approx. Each Wt. (lbs.)
208	Copper	0.2
A208	Aluminum	0.1
208T	ETPB*	0.2



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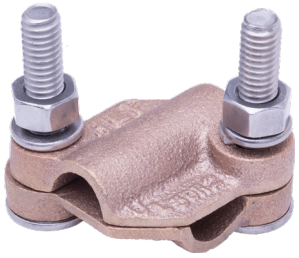


- Approximately 7/8" x 1-5/8" one bolt, two piece connector splices bonding conductor to all standard size Class I and Class II conductors up to 9/16" diameter.
- Accommodates ground cable sizes ranging from #6 AWG through 4/0.
- 5/16" x 1-3/4" stainless steel carriage bolt, flat washer and nut included.
- Recommended installation tool - 1/2" deep socket wrench, end wrench or nut driver.
- 208 & 208T are suitable for direct burial in earth & concrete.

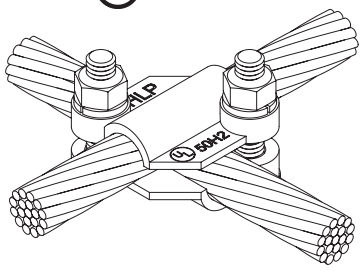
*ETPB - Electro Tin Plated Bronze

Cross Run Connectors

Part No.	Material	Class	Approx. Each Wt. (lbs.)
210	Copper	II	0.3
210T	ETPB*	II	0.4



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- 1-1/2" x 1-1/2" two bolt, two piece connector splices perpendicular intersecting standard Class I and Class II conductors up to 9/16" diameter.
- Two 5/16" x 1-1/2" stainless steel carriage bolts assure a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

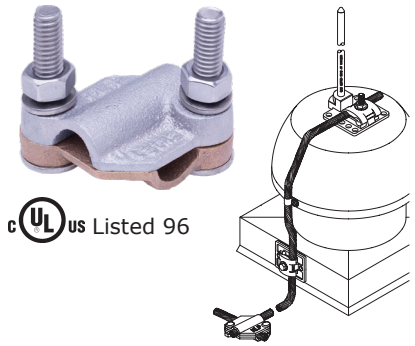
*ETPB - Electro Tin Plated Bronze

Bi-Metal Connectors

Bi-Metal 2 Bolt 2 Piece

Part No.	Material	Class	Approx. Each Wt. (lbs.)
210BM	Bi-Metal	II	0.3

- 1-1/2" x 1-1/2" two bolt, two-piece, bi-metal connector allows splicing of aluminum and copper conductors.
- Ideal when splicing aluminum conductor to main copper conductor run.
- Accepts all main size lightning conductors up to 9/16" diameter.
- Two 5/16" stainless steel carriage bolts assure a positive electrical connection.
- Manufactured from high conductivity copper and aluminum alloys.



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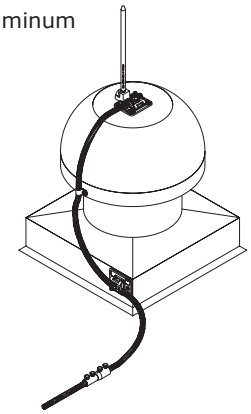
Bi-Metal 4" Long 4 Bolt

Part No.	Material	Class	Approx. Each Wt. (lbs.)
211R	Bi-Metal	II	0.3

- Approximately 4" long, four bolt bi-metal connector provides a non-electrolytic connection between copper and aluminum conductors.
- Accepts all Class I & Class II conductors.
- Four 5/16" hex head stainless steel cap screws assure a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.



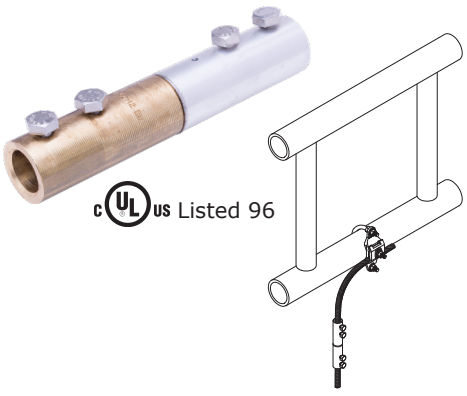
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Bi-Metal 6" Long 4 Bolt

Part No.	Material	Class	Approx. Each Wt. (lbs.)
211XL	Bi-Metal	II	0.9

- 6" long, four bolt bi-metal connector provides a non-electrolytic connection between copper and aluminum conductors.
- Accepts all Class I & Class II conductors.
- Four 5/16" x 1/2" hex head stainless steel cap screws assure a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.



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TECHNICAL NOTE:

- Aluminum materials shall not be used within 18 in (450 mm) of the point where the lightning protection system conductor comes into contact with the earth. Fittings used for the connection of aluminum down conductors to copper or copper-clad grounding equipment shall be of the bimetallic type. Bimetallic connectors shall be installed not less than 18 in (450 mm) above earth level.*

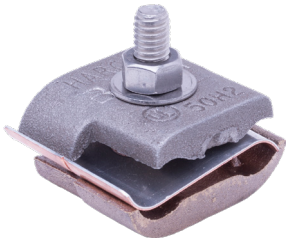
*NFPA 780 Use of Aluminum

Bi-Metal Connectors

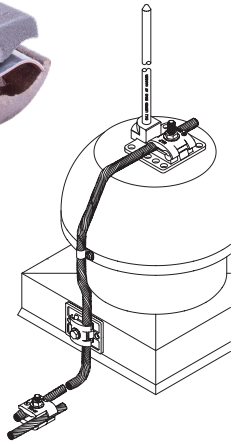
Bi-Metal 1 Bolt Parallel Connector

Part No.	Material	Class	Approx. Each Wt. (lbs.)
BM1BC	Bi-Metal	II	0.3

- 2" x 1-1/2" one bolt, three piece, bi-metal connector allows splicing of aluminum conductors to copper conductors.
- Accepts all Class I & Class II conductors.
- Ideal when splicing aluminum conductor to main copper conductor run.
- One 5/16" x 1-1/4" stainless steel pressed bolt assures a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.



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TECHNICAL NOTE:

- Aluminum materials shall not be used within 18 in. (450 mm) of the point where the lightning protection system conductor comes into contact with the earth. Fittings used for the connection of aluminum down conductors to copper or copper-clad grounding equipment shall be of the bimetallic type. Bimetallic connectors shall be installed not less than 18 in (450 mm) above earth level.*

*NFPA 780 Use of Aluminum

1 Bolt Parallel Connectors

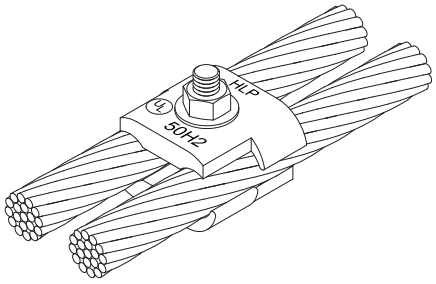
Part No.	Material	Class	Approx. Each Wt. (lbs.)
B1BC	Copper	II	0.4
A1BC	Aluminum	II	0.2
TB1BC	ETPB*	II	0.4

- 2" x 1-1/2" one bolt, two piece, connector allows splicing of conductors.
- Accepts all Class I & Class II conductors.
- Accepts grounding conductors ranging from #6 AWG to 250 MCM.
- One 5/16" x 1-1/4" stainless steel pressed bolt assures a positive electrical connection.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- B1BC & TB1BC are suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze



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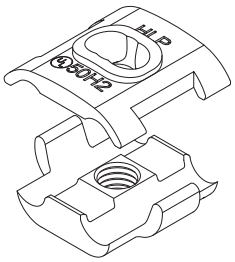
Parallel Cable Connectors

Part No.	Material	Class	Approx. Each Wt. (lbs.)
212-1/2	Copper	II	0.4
A2121/2	Aluminum	II	0.2
212-1/2T	ETPB*	II	0.4

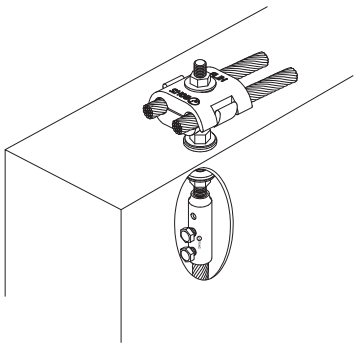
- 2" square, two piece connector provides 1-1/2" surface contact between conductors.
- Accepts all lightning conductors up to 5/8" in diameter and grounding conductors ranging from #6 AWG through 4/0.
- Bottom casting is drilled and tapped 1/2-13 UNC coarse thread.
- Top piece accepts 1/2" threaded rod.
- No hardware provided.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

*ETPB - Electro Tin Plated Bronze





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Cable to Flat Metal Connectors

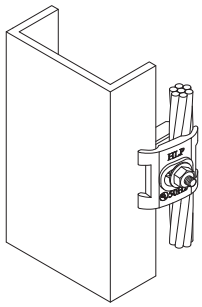
Part No.	Tamper Resistant	Material	Class	Approx. Each Wt. (lbs.)
213	No	Copper	II	0.4
A213	No	Aluminum	II	0.2
213T	No	ETPB*	II	0.4
213TTP	Yes	ETPB*	II	0.4

- Approximately 1-3/4" x 2" two piece, one bolt connector connects all lightning conductor cables through 37/64" diameter to flat metal objects up to 1/2" thickness such as steel ladders, small I-beams, channel, etc.
- 5/16" x 1-1/4" stainless steel cap screw with flat washer included.
- 213TTP - Used in high theft areas. 5/16" x 1-1/4" stainless steel tamper proof hardware included.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- Suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze.



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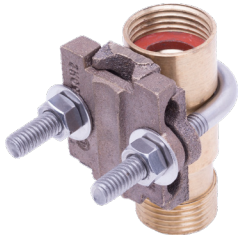


Tamper Proof Hardware

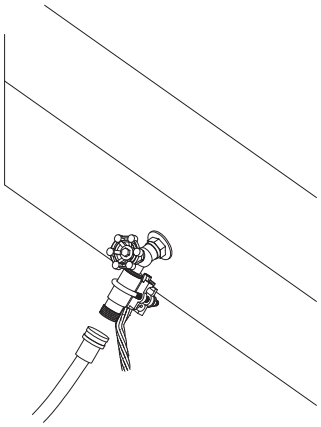
Sillcock Ground Connector

Part No.	Material	Class	Approx. Each Wt. (lbs.)
SCGC	Copper	II	1

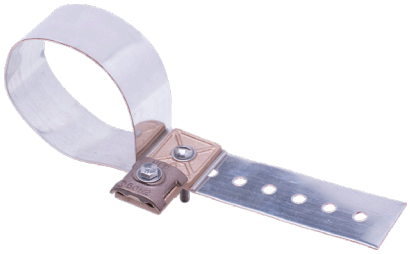
- Manufactured from cast bronze, brass and stainless steel.
- Accepts all Class I & Class II conductors.
- Allows for required bonding of water pipe system to lightning protection system.
- Mounts directly onto standard 3/4" sillcock threads.
- Recommended installation tool - channel locks, 1/2" socket wrench, end wrench or nut driver.



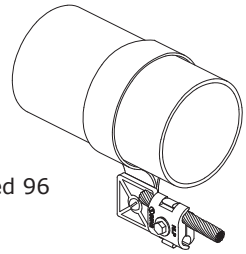
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Strap Type Pipe Clamps



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Part No.	Material	Nominal Pipe Size Range	Outside Diameter	Approx. Each Wt. (lbs.)
231-4	Copper	3" - 4"	2.25" - 4.5"	1.4
A2314	Aluminum	3" - 4"	2.25" - 4.5"	0.9
231-6	Copper	4" - 6"	4.5" - 6.625"	1.8
A2316	Aluminum	4" - 6"	4.5" - 6.625"	1
231-8	Copper	6" - 8"	6.5" - 8.625"	2
A2318	Aluminum	6" - 8"	6.5" - 8.625"	1.2
231-10	Copper	8" - 10"	8.625" - 10.75"	0.3
A23110	Aluminum	8" - 10"	8.625" - 10.75"	1
231-12	Copper	10" - 12"	10.75" - 12.75"	3
A23112	Aluminum	10" - 12"	10.75" - 12.75"	1.3

- 2" wide electro plated tin copper strap with heavy duty bonding lug for use with all cables #6 AWG through 4/0.
- Additional sizes available. Contact factory for more information.

CPC & APC Pipe Clamps

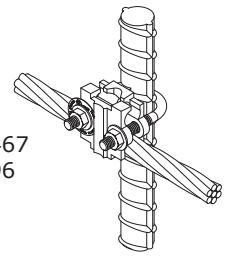
- Wide conductor range; #6 Solid through 250 MCM.
* Electro Tin Plated Bronze includes stainless steel hardware.
- CPC series only Dual UL Listing (UL96 and UL467).
- CPC series rated for direct burial in earth & concrete.

Pipe Range .5/.75

Part No.	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC.5/.75	ETPB*	.5" - .75"	0.375" - 1"	0.5
APC.5/.75	ETPB*	.5" - .75"	0.375" - 1"	0.3



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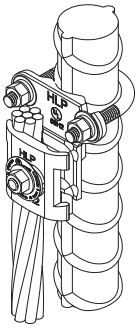


Pipe Range 1/1.25

Part No.	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1/1.25	ETPB*	1" - 1.25"	0.9375" - 1.7"	0.8
APC1/1.25	Aluminum	1" - 1.25"	0.9375" - 1.7"	0.4
APCBM1/1.25	Bi-Metal	1" - 1.25"	0.9375" - 1.7"	0.4



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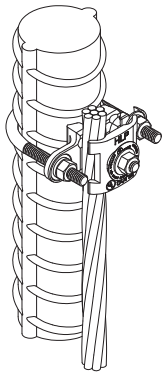
- Features quick connect, bi-directional design.
- Pressed stud design ensures a flush mounting surface.
- When using ductile-iron piping, verify actual outside diameter of piping in within pipe outside diameter range.
- Bi-Metal includes a stainless steel separator that allows copper to be connected to aluminum pipe.

Pipe Range 1.5/2 - 5/6

Part No.	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Approx. Each Wt. (lbs.)
CPC1.5/2	ETPB*	1.5" - 2"	1.25" - 2.4"	0.7
APC1.5/2	Aluminum	1.5" - 2"	1.25" - 2.4"	0.4
APCBM1.5/2	Bi-Metal	1.5" - 2"	1.25" - 2.4"	0.4
CPC2.5/3	ETPB*	2.5" - 3"	2.5" - 3.5"	0.9
APC2.5/3	Aluminum	2.5" - 3"	2.5" - 3.5"	0.5
APCBM2.5/3	Bi-Metal	2.5" - 3"	2.5" - 3.5"	0.5
CPC3.5/4	ETPB*	3.5" - 4"	3.375" - 4.5"	1.2
APC3.5/4	Aluminum	3.5" - 4"	3.375" - 4.5"	0.6
APCBM3.5/4	Bi-Metal	3.5" - 4"	3.375" - 4.5"	0.6
CPC5/6	ETPB*	5" - 6"	4.75" - 6.63"	1.7
APC5/6	Aluminum	5" - 6"	4.75" - 6.63"	0.9
APCBM5/6	Bi-Metal	5" - 6"	4.75" - 6.63"	1



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APCBM Series

- Features quick connect, bi-directional design.
- Pressed stud design ensures a flush mounting surface
- When using ductile-iron piping, verify actual outside diameter of piping in within pipe outside diameter range.
- Bi-Metal includes a stainless steel separator that allows copper to be connected to aluminum pipe.

Bonding Lugs & Plates

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Bonding Lugs

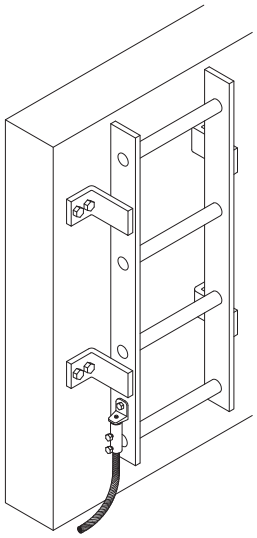
Part No.	Material	Approx. Each Wt. (lbs.)
214	Copper	0.3
A214	Aluminum	0.2
214T	ETPB*	0.2

- For secondary bonding of small metallic bodies.
- 1" high x 3" long secondary bonding lug contains two 5/16" x 3/4" stainless steel cap screws.
- Accommodates bonding or main size lightning conductors ranging from #4 solid to A37R.
- Provides approximately 1 square inch of contact area.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

*ETPB - Electro Tin Plated Bronze



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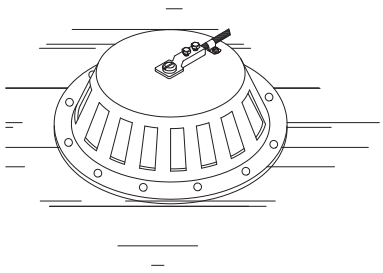


Part No.	Material	Approx. Each Wt. (lbs.)
216	Copper	0.2
A216	Aluminum	0.1

- For secondary bonding of small metallic bodies.
- 1" high x 3" long secondary bonding lug contains two 5/16" x 3/4" stainless steel cap screws.
- Accommodates bonding conductors up to #4 AWG.
- Provides approximately 1 square inch of contact area.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.



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TECHNICAL NOTES:

- A connector fitting shall be constructed so that a minimum of 1-1/2 in (38 mm) of each conductor can be secured within the connector.*
- The fitting shall be provided with at least two 1/8 in (3.2 mm) high projections on an interior surface that embed in the conductor when the connector is compressed around the conductor.*

*UL 96 Standard for Lightning Protection Components

Bonding Lugs

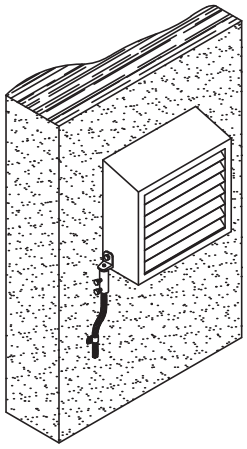
Bi-Metal

Part No.	Material	Approx. Each Wt. (lbs.)
216BM	Bi-Metal	0.3

- 13/16" x 3-1/4" bi-metal secondary bonding lug allows bonding to aluminum or steel surfaces from copper cable runs.
- For secondary bonding of small metallic bodies that require an aluminum connection for compatibility such as gutters, ladders, mechanical units and drain vents.
- Two 5/16" x 3/4" stainless steel bolts assure a positive electrical connection.
- Will accommodate bonding or main size lightning conductors or #6 solid to 4/0 concentric conductors.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.



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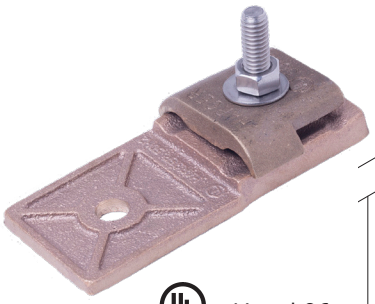


Heavy Duty

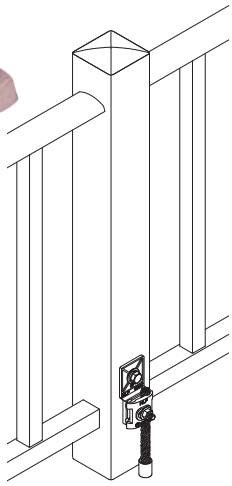
Part No.	Material	Class	Approx. Each Wt. (lbs.)
222	Copper	II	0.5
A222	Aluminum	II	0.2
222T	ETPB*	II	0.5

- 3-1/2" x 1-3/4" cast lug provides over 3-1/2 square inches of bonding surface.
- Accepts all Class I & Class II conductors.
- Tang features a 3/8" mounting hole.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

*ETPB - Electro Tin Plated Bronze



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TECHNICAL NOTES:

- A connector fitting shall be constructed so that a minimum of 1-1/2 in (38 mm) of each conductor can be secured within the connector.*
- The fitting shall be provided with at least two 1/8 in (3.2 mm) high projections on an interior surface that embed in the conductor when the connector is compressed around the conductor.*

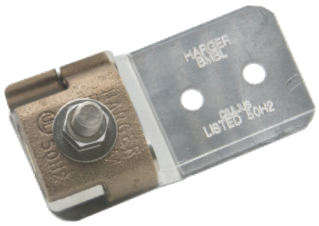
*UL 96 Standard for Lightning Protection Components

Bonding Lugs

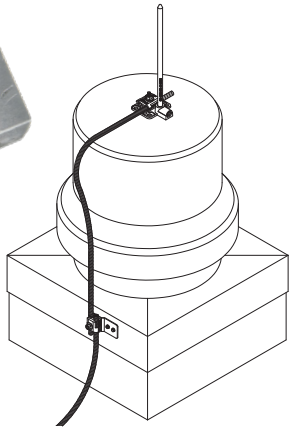
Bi-Metal

Part No.	Material	Class	Approx. Each Wt. (lbs.)
BMBL	Bi-Metal	II	0.4

- For bonding of larger metallic bodies that require an aluminum connection for compatibility such as mechanical units, copings, rooftop cable tray and antenna frames.
- 2" x 4-3/16" x 0.10" aluminum base plate has over 4 square inches of surface contact.
- Accepts all Class I & Class II conductors.
- Bi-metallic mechanical connector provides 1-1/2" of contact length with conductors.



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TECHNICAL NOTES:

- A connector fitting shall be constructed so that a minimum of 1-1/2 in (38 mm) of each conductor can be secured within the connector.*
- The fitting shall be provided with at least two 1/8 in (3.2 mm) high projections on an interior surface that embed in the conductor when the connector is compressed around the conductor.*

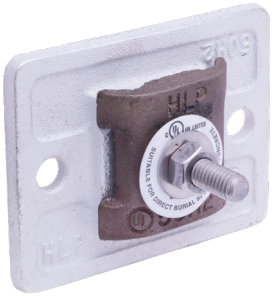
*UL 96 Standard for Lightning Protection Components

Bonding Plates

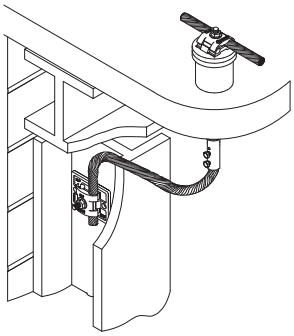
Part No.	Material	Class	Approx. Each Wt. (lbs.)
217	ETPB*	II	0.7
A217	Aluminum	II	0.2

- Features a pressed-in stud; ensures flat mounting surface.
- Approximately 2-1/2" x 3-1/4" cast bonding plate provides over 8 square inches of bonding surface.
- Accepts all Class I & Class II conductors.
- Two 5/16" mounting holes provide secure mounting.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- 217 suitable for direct burial in earth & concrete.

*ETPB - Electro Tin Plated Bronze



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TECHNICAL NOTES:

- A bonding plate shall have a minimum thickness of not less than 3/32 in (2.4 mm). The thickness shall not be less than 5/16 in (7.9 mm) for bosses for screw threads.*
- A Class I bonding plate shall have a minimum surface contact area of 3 square in (19.4 cm^2).*
- A Class II bonding plate shall comply with the material and dimensional requirements for Class I bonding plates.
- A bonding plate for utilizing the steel framework as a conductor shall have a surface contact area of not less than 8 square in (52 cm^2).*

*UL 96 Standard for Lightning Protection Components

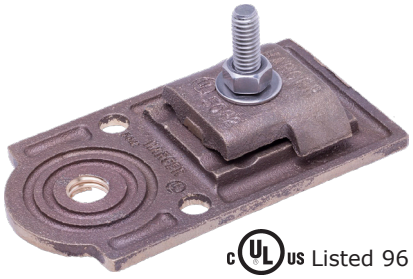
Bonding Plates

Bolt Hole

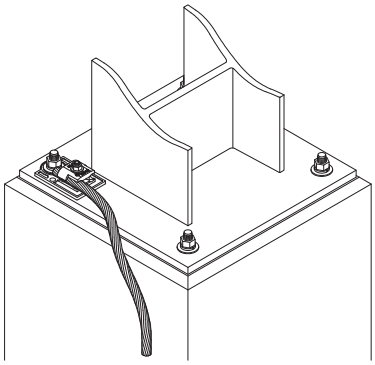
Part No.	Material	Hole Size	Hole Type	Class	Approx. Each Wt. (lbs.)
219-3/8	Copper	3/8"	Tapped	II	0.7
A219-3/8	Aluminum	3/8"	Tapped	II	0.2
219-3/8T	ETPB*	3/8"	Tapped	II	0.7
219-1/2	Copper	1/2"	Tapped	II	0.6
A219-1/2	Aluminum	1/2"	Tapped	II	0.2
219-1/2T	ETPB*	1/2"	Tapped	II	0.7
219-5/8	Copper	5/8"	Thru	II	0.8
A219-5/8	Aluminum	5/8"	Thru	II	0.2
219-5/8T	ETPB*	5/8"	Thru	II	0.6
219-1	Copper	1"	Thru	II	0.6
A219-1	Aluminum	1"	Thru	II	0.2
219-1T	ETPB*	1"	Thru	II	0.6

- 2-1/2" x 4" cast bonding plate provides over 8 square inches of bonding surface.
- Accepts all Class I & Class II conductors.
- Used over anchor bolts to ground steel columns.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

*ETPB - Electro Tin Plated Bronze



c UL us Listed 96



TECHNICAL NOTES:

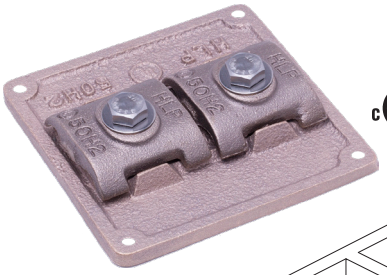
- A bonding plate shall have a minimum thickness of not less than 3/32 in (2.4 mm). The thickness shall not be less than 5/16 in (7.9 mm) for bosses for screw threads.*
- A Class I bonding plate shall have a minimum surface contact area of 3 square in (19.4 cm^2).*
- A Class II bonding plate shall comply with the material and dimensional requirements for Class I bonding plates.
- A bonding plate for utilizing the steel framework as a conductor shall have a surface contact area of not less than 8 square in (52 cm^2).*

*UL 96 Standard for Lightning Protection Components

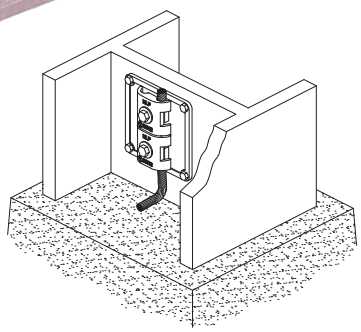
Bonding Plates

Heavy Duty

Part No.	Material	Class	Approx. Each Wt. (lbs.)
220	Copper	II	1.2
A220	Aluminum	II	0.4
220T	ETPB*	II	1.2



c UL us Listed 96

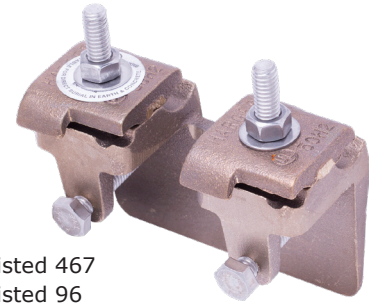


- 3-3/4" x 3-3/4" heavy duty bonding plate provides over 14 square inches of bonding surface.
- Large cable connector offers 3" of contact between the bonding plate and the cable.
- Accepts all Class I & Class II conductors.
- Will accept up to four cables.
- Four 5/16" mounting holes.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.

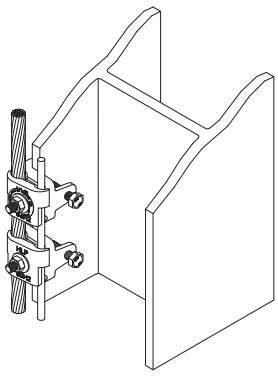
*ETPB - Electro Tin Plated Bronze

Flange

Part No.	Material	Tamper Proof	Class	Approx. Each Wt. (lbs.)
223	Copper	No	II	1.6
A223	Aluminum	No	II	0.8
A223BM	Bi-Metal	No	II	0.9
223T	ETPB*	No	II	2.2
223TP	Copper	Yes	II	1.5
223TTP	ETPB*	Yes	II	2.2



c UL us Listed 467
Listed 96



- Provides over 8 square inches of bonding surface.
- Large cable connector offers 3" of contact between the bonding plate and the cable.
- 467 Listed from #6 AWG through #1/0 AWG, accommodates all main size conductors up to 500MCM or 5/8" diameter (A223 and A223BM) excluded.
- Tamper Proof is ideal in high theft areas.
- Bonds to steel up to 1" thick.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- All suitable for direct burial in earth & concrete except A223.

*ETPB - Electro Tin Plated Bronze.



Tamper Proof Hardware

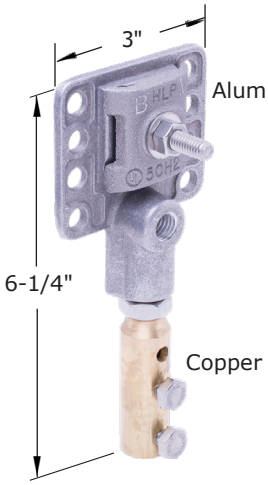
APPLICATION NOTE:

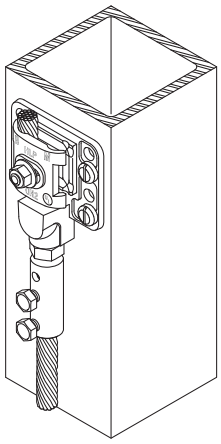
- It is imperative to properly prepare the bonding surface before applying the bonding lug or plate. All paint, rust, moisture and debris must be removed. The use of a rasp or grinding tool is recommended to ensure all surface oxidants have been removed. Generously coat the bonding surface with the appropriate antioxidant, then install the bonding lug or plate.

Bonding Plates

Part No.	Material	Class	Approx. Each Wt. (lbs.)
BMBP	Bi-Metal	II	0.8

- Allows copper conductors to be bonded to aluminum surfaces.
- Provides over 8 square inches of bonding surface.
- Accepts all Class I & Class II conductors.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.





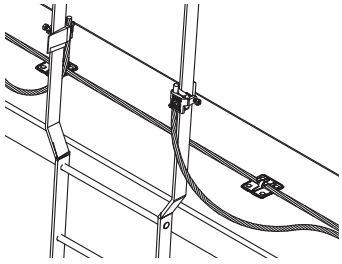
c UL us Listed 96

Secondary Flange

Part No.	Material	Tamper Proof	Class	Approx. Each Wt. (lbs.)
CFBP	Copper	No	I	0.8
CFBPTP	Copper	Yes	I	0.8
AFBP	Aluminum	No	I	0.4
TCFBP	ETBP*	No	I	0.8
TCFBPTP	ETBP*	Yes	I	0.8



Aluminum



- Provides over 4 square inches of bonding surface.
- Large cable connector offers 1-1/2" of contact between the bonding plate and the cable.
- 467 Listed from #6 AWG through #1/0 AWG, accommodates all main size conductors up to 500MCM or 5/8" diameter (AFBP excluded).
- Tamper Proof is ideal in high theft areas.
- Bonds to steel up to 1" thick.
- Recommended installation tool - 1/2" socket wrench, end wrench, or nut driver.

*ETPB - Electro Tin Plated Bronze.



Tamper Proof Hardware

c UL us Listed 467

TECHNICAL NOTES:

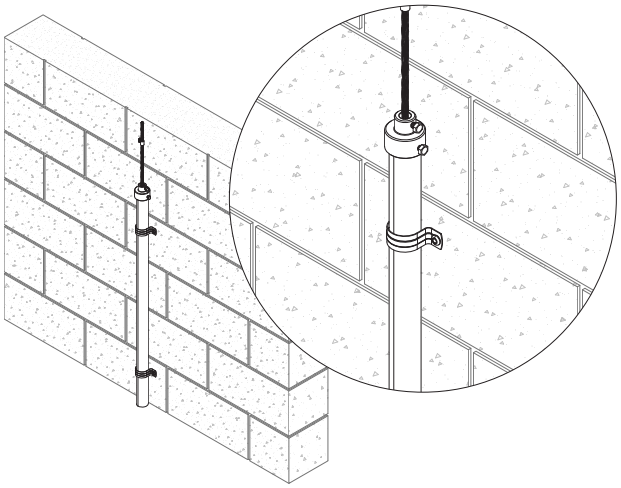
- A bonding plate shall have a minimum thickness of not less than 3/32 in (2.4 mm). The thickness shall not be less than 5/16 in (7.9 mm) for bosses for screw threads.*
- A Class I bonding plate shall have a minimum surface contact area of 3 square in (19.4 cm^2).*
- A Class II bonding plate shall comply with the material and dimensional requirements for Class I bonding plates.
- A bonding plate for utilizing the steel framework as a conductor shall have a surface contact area of not less than 8 square in (52 cm^2).*

*UL 96 Standard for Lightning Protection Components

Conduit Bushings



c UL us Listed 96



Part No.	Material	Class	Conduit O.D. Range	Conduit Trade Size	Approx. Each Wt. (lbs.)
SSCB1	Stainless Steel	Class I - Class II	0.97" - 1.315"	1"	0.5
SSCB1.25	Stainless Steel	Class I - Class II	1.38" - 1.66"	1-1/4"	0.8

- Designed for lightning protection applications.
- Bonding solution where conductor is run in metal conduit.
- Conductor should be bonded as it enters and exits the conduit.

Communications Site Equipment

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Wireless Communications Equipment

Index

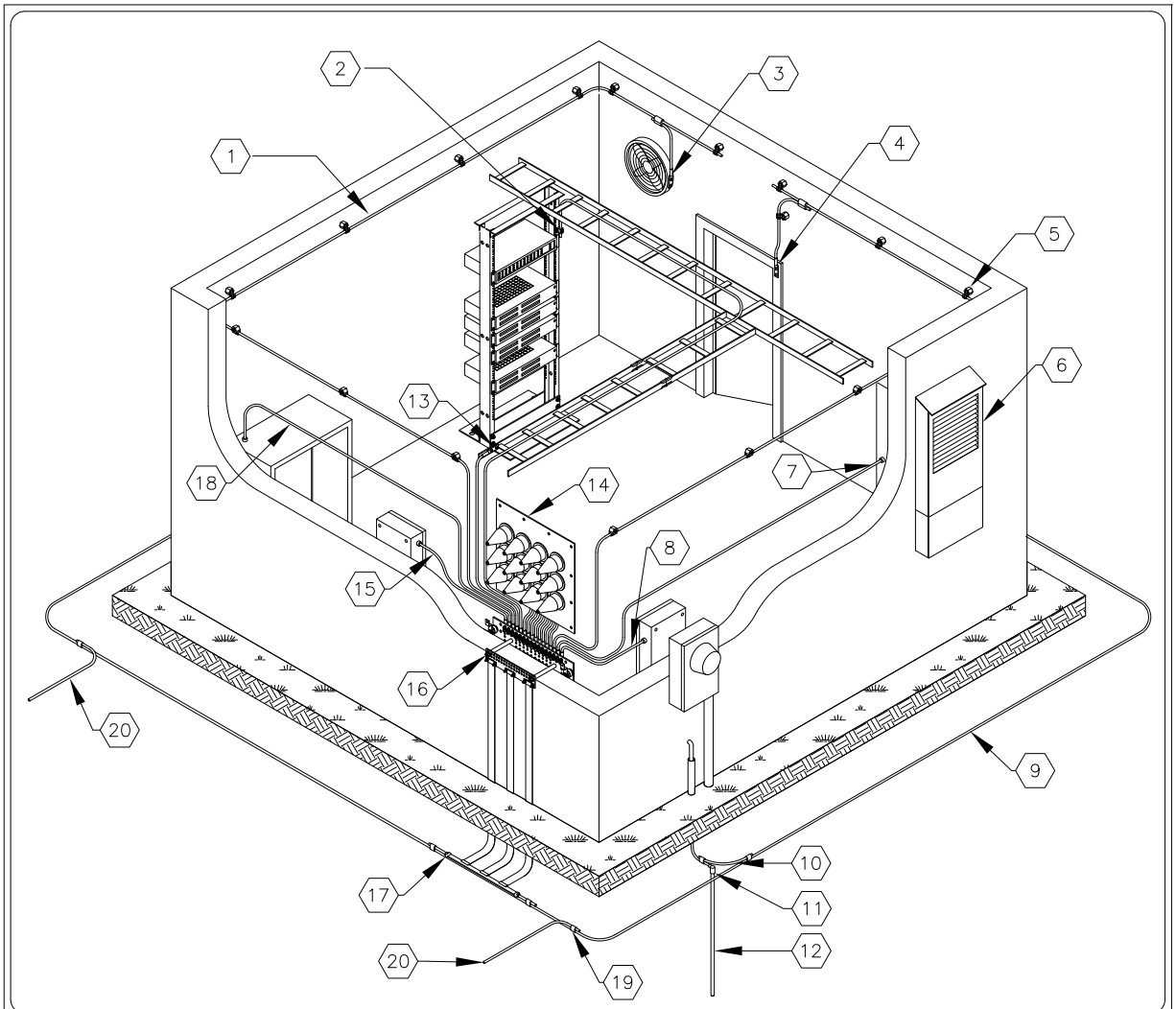
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Shelter Grounding Components

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Interior Shelter Layout



KEYED NOTES

1. NO.27G, #2AWG STRANDED, GREEN INSULATED CONDUCTOR. INTERNAL PERIMETER GROUND BUS. CONNECTED TO MGB AT ONE END. TYPICAL
2. EQUIPMENT RACK CHASSIS AND EQUIPMENT GROUND CONDUCTORS TO MGB
3. BOND EXHAUST FAN AND AIR VENTS TO INTERNAL PERIMETER GROUND BUS CONDUCTOR WITH NO. 6-7G CONDUCTOR, NO. CT2248LD TAP AND NO. GECLB62A LUG
4. BOND DOOR FRAME TO INTERNAL PERIMETER GROUND BUS CONDUCTOR WITH NO. 6-7G CONDUCTOR, NO. CT2248LD TAP AND NO. GECLB62A LUG
5. NO. HSC STYLE HALO STANDOFF CLAMP
6. HVAC UNIT
7. HVAC EQUIPMENT GROUNDING CONDUCTOR TO MGB
8. BOND AC ELECTRIC SERVICE TO MGB PER NFPA 70
9. SHELTER COUNTERPOISE GROUND LOOP. NO. 2T, SOFT-DRAWN TINNED SOLID COOPER CONDUCTOR RUN 30" MIN. OR BELOW FROST LINE.
10. BOND BETWEEN UTILITY GROUND AND SHELTER COUNTERPOISE WITH NO. 2T, SOFT-DRAWN TINNED SOLID COOPER CONDUCTOR
11. ULTRAWELD NO. GD582SB CONNECTION WITH NO. US65 OR NUWTUBE65 WELD METAL
12. NO. 5810, 5/8"X10' COPPER CLAD GROUND ROD. UTILITY SERVICE GROUND
13. BOND CABLE TRAY TO MGB
14. COAX ENTRY PORT
15. TELCO GROUND TO MGB
16. NO. EPK12, ENTRANCE PANEL KIT WITH THROUGH WALL MOUNTING OF EXTERIOR GROUND BAR AND INTERNAL (MGB) GROUND BAR.
17. THE EPK12 ENTRANCE PANEL KIT PROVIDES A GROUND STRAP (1/32" X 3") ASSEMBLY THAT IS EASILY EXOTHERMICALLY WELDED TO THE SHELTER COUNTERPOISE.
18. UPS EQUIPMENT GROUND CONDUCTOR TO MGB
19. ULTRAWELD NO. PT2S2SB CONNECTION WITH NO. US65 OR NUWTUBE65 WELD METAL OR NO. RT2S2SB WITH NO. US45 OR NUWTUBE45 WELDMETAL. TYPICAL
20. TO TOWER GROUND ELECTRODE SYSTEM

HARGER® LIGHTNING PROTECTION•GROUNDING•EXOTHERMIC
301 ZIEGLER DRIVE GRAYSLAKE, IL
60030 (847) 548–8700

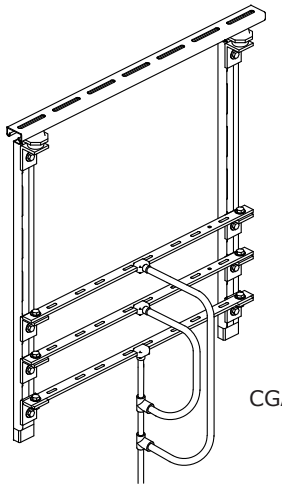
INTERIOR SHELTER LAYOUT

Lightning Arrestor Brackets

Ceiling Mount

Part No.	Description	Approx. Each Wt. (lbs.)
CGARRBKT12	12 Unit	24

- Manufactured from 110 alloy copper bar.
- Arrestor bracket is designed to be mounted to the ceiling of a communication building where communication lines enter the building through the side wall.
- Bracket can hold 4 large flange mount lightning arrestors and comes with a 25' tail of #2 AWG solid tinned conductor for connection to an exterior ground loop.
- Bars are connected with tinned #2 AWG flexible copper conductor.
- Ships assembled.

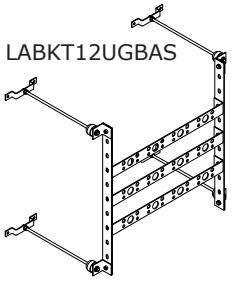


CGARRBKT12

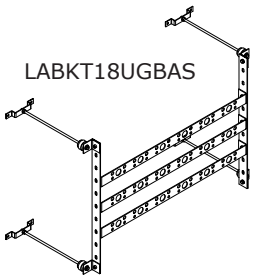
Ceiling/Wall Mounts

Part No.	Description	Configuration	Width	Approx. Each Wt. (lbs.)
LABKT12UGBAS	12 Unit	4 x 3	27"	17
LABKT18UGBAS	18 Unit	6 x 3	39"	25

- Manufactured from 1/8" thick 110 alloy copper bar.
- Accommodates bulkhead arrestors with DIN or N female connectors.
- Premounted self clinching nuts speed installation.
- Can be ceiling or wall mounted.
- Ships unassembled.



LABKT12UGBAS

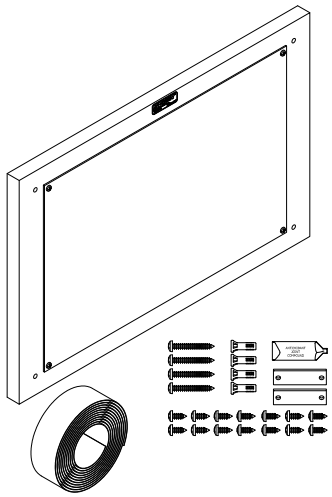


LABKT18UGBAS

Single Point Ground Window

Part No.	Approx. Each Wt. (lbs.)
CUSPGW	11

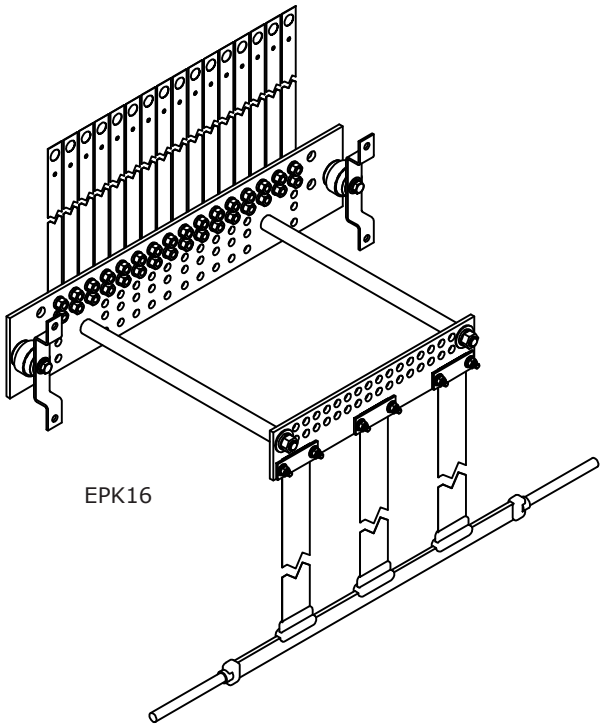
- Flexible installation solution for a single point grounding panel.
- Ground assembly has melamine backing plate with predrilled 16" on center mounting holes.
- Custom configuration available. Contact factory.
- Kit Includes:
  - (2) Sandwich plates with hardware
  - (20') 0.016" x 12" copper flat strap
  - (4) Concrete lead mounting hardware
  - (14) Mounting screws
  - (1) 1/2 oz. tube of HCAJC1/2 antioxidant



Entrance Panel Kits

Part No.	Description	Approx. Each Wt. (lbs.)
EPK12	12 Unit	52
EPK16	16 Unit	53
EPK24	24 Unit	71.5

- Complete 12, 16 and 24 unit entrance panel ground kits provide low impedance to ground for coaxial ground shields and arrestors by utilizing robust flat ground straps.
- Flat ground strap assembly incorporates 3 low impedance (1/32" x 3") copper straps that are exothermically welded to a 1/4" x 1" copper bar that has #2 AWG solid tinned conductor exothermically welded at either end for easy attachment to ground ring.
- Ground strap assembly attaches to the exterior ground bar via 3 integrated sandwich type ground clamps.
- Exterior ground bar has landings (3/8" bolt holes on 3/4" centers) to accommodate up to 16 coaxial ground leads.
- Maximum wall thickness of 9".
- Longer extension bars are available.
- Ships unassembled.



EPK16

EPK12 Kit Includes:
(1) Interior ground bar
(1) Exterior ground bar
(2) Through wall mounting bars
(1) Flat ground strap assembly
(12) Surge suppression ground straps
(1) HCAJC1/2 joint compound
(24) Sets stainless steel fasteners

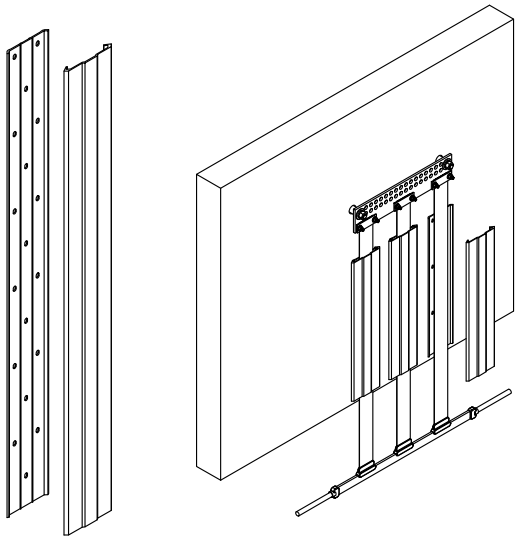
EPK16 Kit Includes:
(1) Interior ground bar
(1) Exterior ground bar
(2) Through wall mounting bars
(1) Flat ground strap assembly
(16) Surge suppression ground straps
(1) HCAJC1/2 joint compound
(32) Sets stainless steel fasteners

EPK24 Kit Includes:
(1) Interior ground bar
(1) Exterior ground bar
(2) Through wall mounting bars
(1) Flat ground strap assembly
(24) Surge suppression ground straps
(1) HCAJC1/2 joint compound
(48) Sets stainless steel fasteners

Channel Support

Part No.	Qty.	Approx. Each Wt. (lbs.)
EPKPPCST5	EA	5

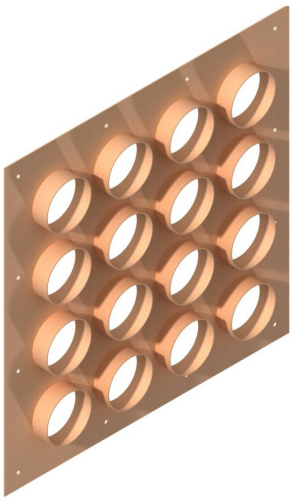
- 5' plastic protective channel supports (includes a front & back).
- Fastens flat ground strap to shelter surface and protects strap from damage.



Entry Panels

Harger's single piece aluminum entrance panels provide a point of entry for coax and fiber cables. This unique 4" formed port design eliminates mechanical fasteners and gaskets that are found with conventional entry panels using a spin formed ring riveted to a flat panel. Older designs warp and loosen up over time separating the gasket from the metal surfaces, making for an unwanted entry point for both weather and insects. Each 4" port can accept standard boot assemblies for sealing and weatherproofing your structure.

Panels come complete with a powder coated maple finish, mounting hardware consisting of stainless steel screws, washers and plastic anchors and sealing caps for all openings.



HLG1447TWP

Aluminum - 4" Ports

Part No.	Description	Wall Opening	Overall Size	Approx. Each Wt. (lbs.)
HLG220TWP	1 Unit Entrance Panel 1x1	4" x 4"	7" x 7"	1
HLG1448TWP	2 Unit Entrance Panel 1x2	4" x 10"	9.5" x 15.5"	2
HLG1449TWP	6 Unit Entrance Panel 2x3	9.5" x 15"	17.5" x 23"	2
HLG576TWP	8 Unit Entrance Panel 2x4	9.5" x 20.5"	17.5" x 25.5"	3
HLG1118TWP	12 Unit Entrance Panel 3x4	15" x 20.5"	25.5" x 25.5"	8
HLG1447TWP	16 Unit Entrance Panel 4x4	20.5" x 20.5"	25.5" x 25.5"	10
HLG1333TWP	18 Unit Entrance Panel 3x6	15" x 31.5"	25.5" x 39.5"	9
HLG1340TWP	24 Unit Entrance Panel 4x6	20.5" x 31.5"	31" x 39.5"	25

Halo Standoff Clamps

APPLICATION NOTE:
- Halo Standoff Clamps are used for mounting interior halo ground rings.



HSC100



HSC100C

Part No.	Clip Style	Conductor Range
HSC100	Stainless Steel w/ Insulating Rubber Grommet	#6 AWG Insulated to #2 AWG Bare
HSC100C	Bare Copper	#6 AWG Insulated to 2/0 AWG Bare

- Will hold the halo 1" off of the wall.
- Supplied with two anchors for mounting to both masonry and stud walls.



HSC150



HSC150C

Part No.	Clip Style	Conductor Range
HSC150	Stainless Steel w/ Insulating Rubber Grommet	#6 AWG Insulated to #2 AWG Bare
HSC150C	Bare Copper	#6 AWG Insulated to 2/0 AWG Bare

- Will hold the halo 1-1/2" off of the wall.
- Supplied with two anchors for mounting to both masonry and stud walls.

Part No.
CC5
CC7



- 304 SS clip with insulating rubber grommet.
- CC5 fits conductors #6 AWG insulated through #2 AWG bare.
- CC7 fits conductors #2 AWG insulated through 2/0 AWG bare.
- CC5 and CC7 have .265" mounting hole.

Halo Standoff Clamps - R56* Compliant

APPLICATION NOTE:
- Halo Standoff Clamps are used for mounting interior halo ground rings.



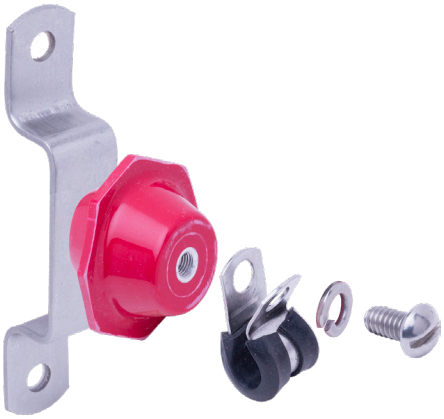
HSC100R56



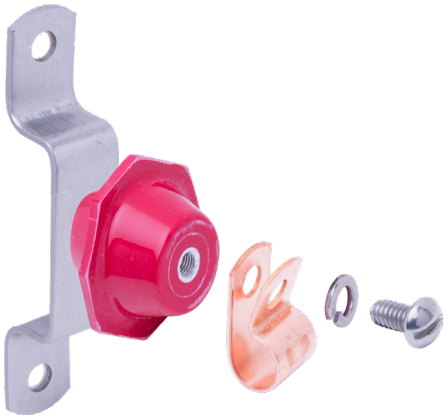
HSC100CR56

Part No.	Clip Style	Conductor Range
HSC100R56	Stainless Steel w/ Insulating Rubber Grommet	#6 AWG Insulated to #2 AWG Bare
HSC100CR56	Bare Copper	#6 AWG Insulated to 2/0 AWG Bare

- Will hold the halo 2" off of the wall.



HSC150R56



HSC150CR56

Part No.	Clip Style	Conductor Range
HSC150R56	Stainless Steel w/ Insulating Rubber Grommet	#6 AWG Insulated to #2 AWG Bare
HSC150CR56	Bare Copper	#6 AWG Insulated to 2/0 AWG Bare

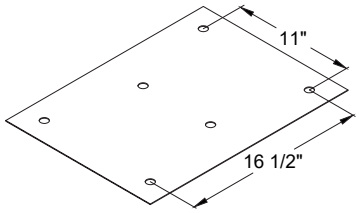
- Will hold the halo 2-1/2" off of the wall.

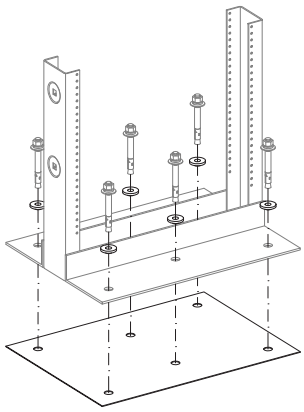
*R56 is Motorola, Inc. Standards and Guidelines for Communication Sites

Rack Isolating Pad

Part No.	Approx. Each Wt. (lbs.)
IP0621520.5MOTO	1.5

- Used to isolate racks from conductive flooring such as concrete and prevent multiple ground paths.
- .062” x 15” x 20-1/2” GPO-3 Phenolic Isolation Pad designed to fit Motorola equipment racks.
- Includes six isolating shoulder washers designed to accommodate 1/2” anchors.
- Other sizes and configurations available. Contact factory for more information.





Conduit Bonding Clamps

Part No.	Conduit Range	Conductor Range (AWG)	Approx. Each Wt. (lbs.)
BGC4SCS	1/2" - 3/4"	#10 - #2	0.15
TBGC4SCS*	1/2" - 3/4"	#10 - #2	0.17
TBGC4SCSSS**	1/2" - 3/4"	#10 - #2	0.17

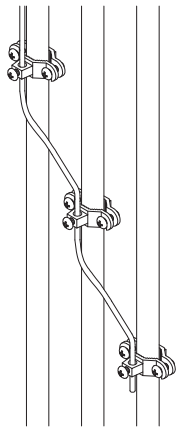
- Bronze clamp for bonding conduits that are flush mounted to a surface such as a wall, floor or ceiling.
- Design utilizes 1/4" diameter long machine screws.

* Electro tin plated bronze.

** Includes stainless steel hardware. Rated for direct burial.



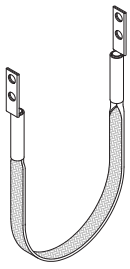
c UL us Listed 467

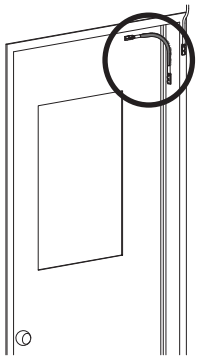


Door Jumpers

Part No.	Length	Approx. Each Wt. (lbs.)
GS12094122A1/4	12"	0.5
GS12094182A1/4	18"	0.5

- Door jumpers made from 1/2" x .094 flexible tinned copper flat braid.
- Two holes spaced 5/8" on center per each end.
- Braid is 6 gauge equivalent.
- Dimensions are nominal size.
- Hole size is 1/4".





Part No.	Length	Approx. Each Wt. (lbs.)
GJ6TCR12R11/4	12"	0.15
GJ6TCR18R11/4	18"	0.19

- #6 Tinned copper rope lay for flexibility.
- Single hole terminals for ¼” mounting hardware.

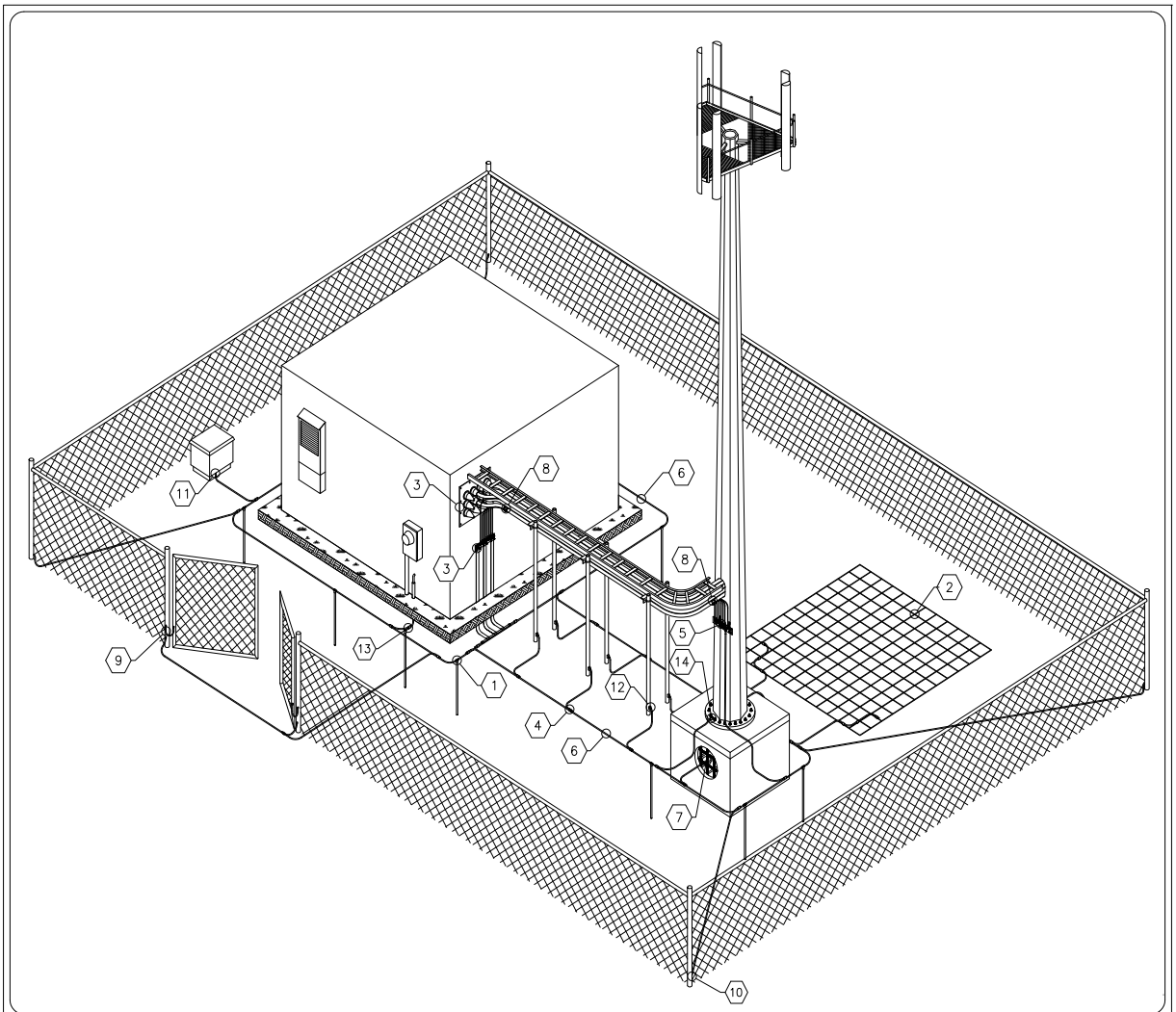


Tower Grounding Components

Index

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Banjo Clamp	229
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Exterior Grounding Layout



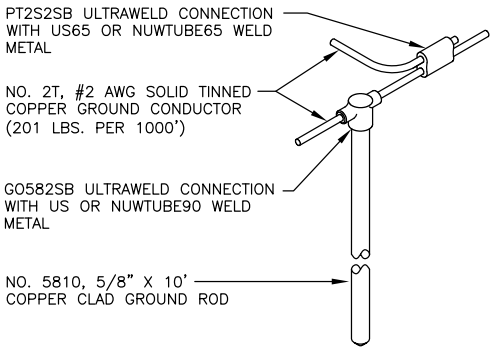
KEYED NOTES

1. NO. 5810, 5/8" x 10'–0" COPPERCLAD GROUND ROD SPACED AT 16' MINIMUM WITH ULTRAWELD CONNECTION TYPE "GO582SB" (MOLD NUMBER) AND NUWTUBE90 (WELD METAL SIZE–ONE PER LOCATION) SEE DETAIL "G".
2. NO. GM121266, 12'–0" x 12'–0" GROUND MAT WITH NO. 6 AWG. SOLID BARE COPPER CONDUCTOR AT 6" O.C. EACH WAY, 24" BELOW GRADE OR FROST LINE, WHICH EVER IS LOWER. NO. 2T, #2 AWG SOLID TINNED COPPER GROUND CONDUCTOR SHALL BE ATTACHED TO THE MAT USING ULTRAWELD CONNECTION PT6S2SB (MOLD NUMBER) AND US45 OR NUWTUBEW45 (WELD METAL SIZE) AT THREE PLACES PER NO. 2T GROUND CONDUCTOR.
3. NO. EPK12, 12 UNIT ENTRANCE PANEL KIT WITH INTEGRATED 1/4"x5"x24" SOLID COPPER INTERIOR GROUND BAR WITH INSULATORS AND 1/4"x3"x14.5" EXTERIOR GROUND BAR.(INSTALL NEAR THE POINT WHERE THE COAX LINES ENTER THE SHELTER) SEE DETAIL "EPK".
4. CABLE TO CABLE CONNECTION WITH NO. PT2S2SB (MOLD NUMBER) ULTRAWELD CONNECTION WITH NO. US65 OR NUWTUBE65 (WELD METAL SIZE – ONE PER LOCATION).
5. NO. GBIA14424M, 1/4"x4"x24" SOLID COPPER TOWER GROUND BAR WITH INSULATOR AND BEAM CLAMP STANDOFFS. COAX CABLES SHALL BE GROUNDED TO TOWER AT THE TOP AND BOTTOM OF THE TOWER AND EVERY 75' OR LESS IF THE TOWER IS TALLER THAN 150". SEE DETAIL "GB".
6. NO. 2T, #2 AWG SOLID TIN COATED COPPER CONDUCTOR (201 LBS. PER 1000) LOCATED AT 2'–6" MIN. BELOW GRADE OR 6" BELOW THE FROST LINE, WHICH EVER IS LOWER.
7. "RE" OR "RP" STYLE ULTRAWELD CONNECTION BONDING REBAR IN TOWER FOOTING. *VERIFY SIZE OF REBAR PRIOR TO ORDERING.
8. BOND COAX CABLE USING NO. CGKB SERIES GROUND KIT TO EXTERIOR GROUND BARS. PART NUMBER IS SPECIFIC TO COAX SIZE. SEE COAX CABLE GROUNDING DETAIL "CGK".
9. NO. GJX2S24, FLEXIBLE BONDING JUMPER WITH ULTRAWELD CONNECTION TYPE VA2SV1.5x4B (WELD MOLD) AND US45 OR NUWTUBE45 (WELD METAL SIZE) – ONE PER GATE. SEE DETAIL "FG"
10. ULTRAWELD CONNECTION TO 3" – 4" DIA. FENCE POST TYPE VA2SV1.5x4B (MOLD NUMBER) AND US45 OR NUWTUBE45 (WELD METAL SIZE)– ONE PER LOCATION. SEE DETAIL "FG"
11. ALL CONDUCTIVE BODIES SHALL BE BONDED TO THE GROUNDING SYSTEM.
12. BOND WAVE GUIDE SUPPORTS TO EXTERIOR GROUND LOOP.
13. PROVIDE CONNECTION TO EXTERIOR POWER AND TELEPHONE GROUNDING SYSTEMS AND WATER SERVICE.
14. GROUND TOWER (2 LOCATIONS) WITH NO. HD2SA (MOLD NUMBER) ULTRAWELD CONNECTION WITH NO. US45 OR NUWTUBE45 (WELD METAL SIZE)– ONE PER LOCATION.

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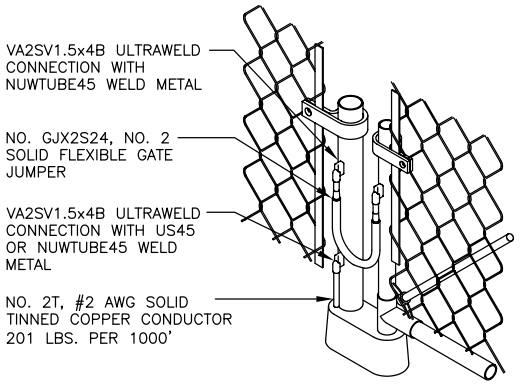
Typical Wireless Communication Site
Exterior Grounding Plan

Exterior Grounding Layout



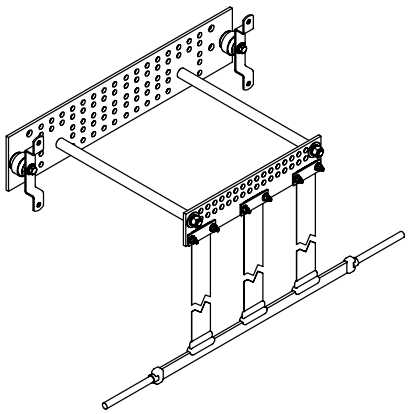
GROUND ROD DETAIL "G"

NTS



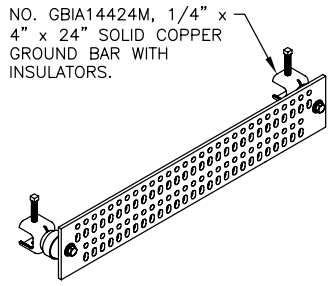
FENCE GROUNDING DETAIL "FG"

NTS



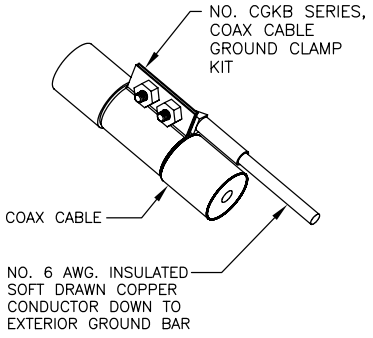
ENTRANCE PANEL DETAIL "EPK"

NTS



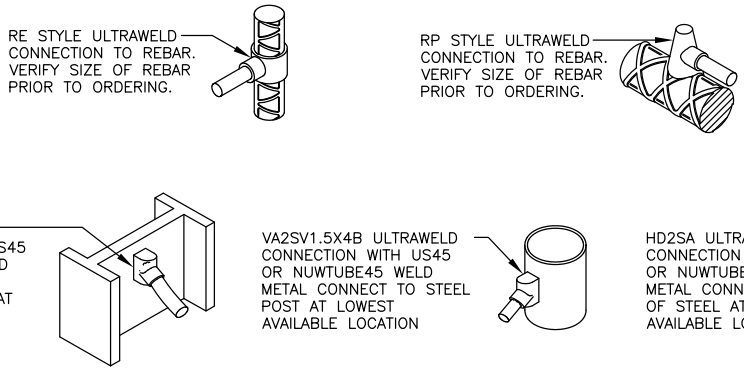
GROUND BAR DETAIL "GB"

NTS



COAX GROUNDING DETAIL "CGK"

NTS



ULTRAWELD DETAILS

NTS

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Typical Wireless Communication Site
Exterior Grounding Plan

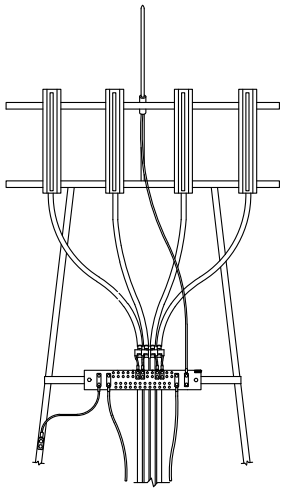
Tower Air Terminals

Stainless Steel

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
586SS3AT	5/8"	6'	6.6

- Made from 304 stainless steel.
- Air terminal features 2" of 5/8"-11 UNC coarse threads and comes complete with 2 each of stainless steel jam nuts, lock washers and flat washers.

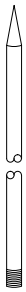




Solid Copper

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
1248SCAT	1/2"	4'	3.2

- Used where solid copper air terminals are preferred.
- Air terminal features 2" of 1/2"-13 UNC coarse threads and comes complete with 2 each of stainless steel jam nuts, lock washers and flat washers.



c UL us Listed 96

Copper-Bonded Steel

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
585CCAT	5/8"	5'	4.9

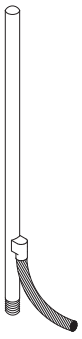
- Made from copper-bonded steel (10 mil).
- Air terminal features 2" of 5/8"-11 UNC coarse threads and comes complete with 2 each of stainless steel jam nuts, lock washers and flat washers.
- Copper-bonded steel provides greater strength and is less susceptible to wind shear than solid copper air terminals.



Copper-Bonded Steel

Part No.	Diameter	Length	Approx. Each Wt. (lbs.)
585CCAT-2/0	5/8"	5'	15.4

- Made from copper-bonded steel (10 mil).
- Air terminal features 2" of 5/8"-11 UNC coarse threads and comes complete with 2 each of stainless steel jam nuts, lock washers and flat washers.
- 25' of 2/0 AWG 19 strand copper conductor exothermically welded to air terminal.
- Tail can be exothermically welded to steel tower, ground bar or connected to a down conductor.



NOTE:
- Other sizes are available. Contact factory for more information.
- Tower air terminals are mounted on top of and on the sides of towers to help protect tower lighting, antennas, dishes, etc. from direct lightning strikes.

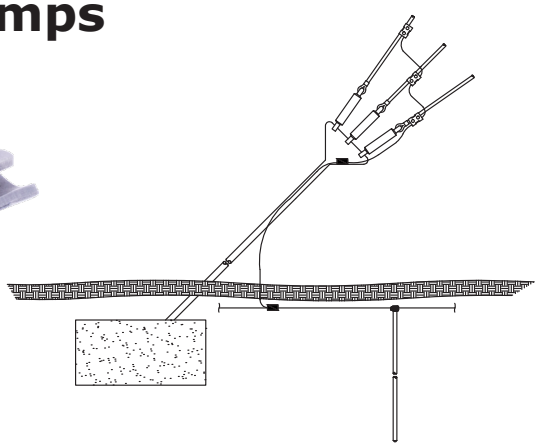
Guy Wire Clamps

Conductor to Guy Wire

Part No.	Approx. Each Wt. (lbs.)
SSC25/875	0.4

- Can be used for connecting 2 dissimilar conductors such as copper and galvanized steel.
- One bolt stainless steel clamp comes with stainless steel hardware.
- Accommodates up to 7/8" guy wire and 4/0 AWG conductor.

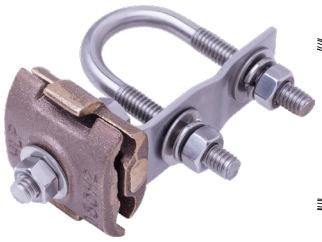


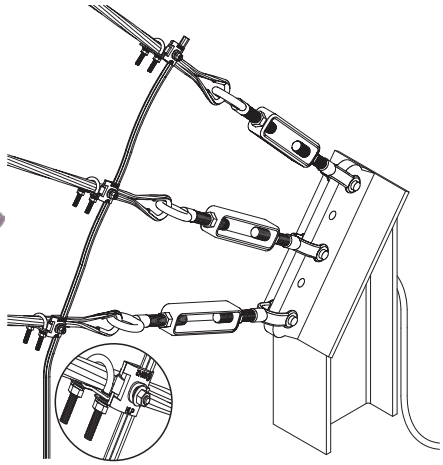


Conductor to Guy Wire

Part No.	Approx. Each Wt. (lbs.)
SSGC.75/1-OD	0.8
SSGC1.00/1.625-OD	0.8
SSGC1.625/2.375-OD	1
SSGC2.375/3.5-OD	1.1

- Can be used for connecting 2 dissimilar conductors such as copper and galvanized steel.
- One bolt stainless steel clamp comes with stainless steel hardware.
- Accommodates up to 1" guy wire and 4/0 AWG conductor.





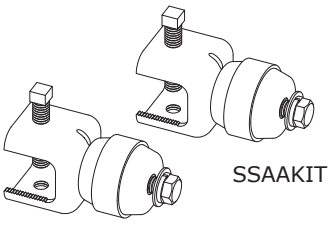
Beam Clamps

Part No.	Approx. Each Wt. (lbs.)
SSAA	0.5
SSAAKIT	1.6

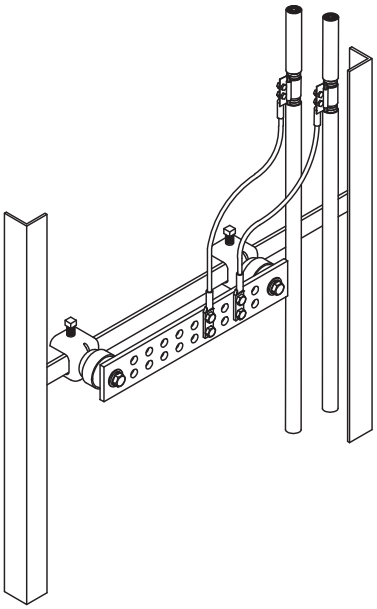
- Manufactured from 304 series stainless steel.
- SSAAKIT includes two assemblies (pictured). 3/8" stainless steel hardware fastens kit to ground bar.
- SSAAKIT also includes R4150A4 insulators.
- Will accommodate up to 1" thick material.



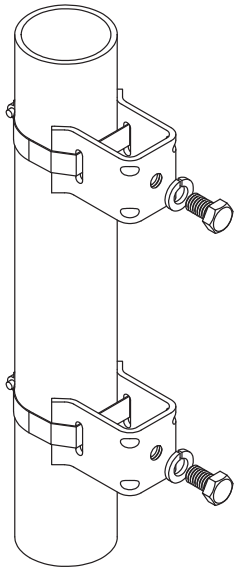
SSAA



SSAAKIT



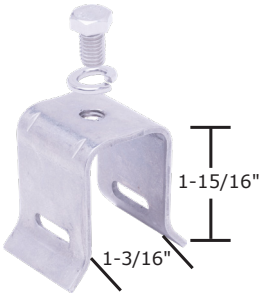
Tower Standoff for Round Members
TSO Series



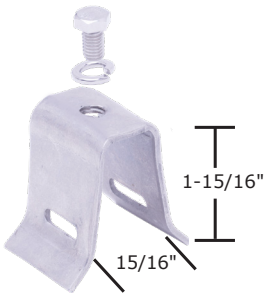
- The fast, easy and economical way to make quality attachments of ground bars and other components to round tower members.
- Manufactured from 300 series stainless steel for optimum compatibility.
- 3/8-16 x 5/8" stainless steel hex head cap screw and lock washer included.
- Available with or without stainless steel hose clamps in a variety of sizes.

Tower Standoffs

Part No.	Band Clamp Included	Approx. Each Wt. (lbs.)	Pieces Per Part No.
TSO	No	2.8	10
TSOM	No	2	10



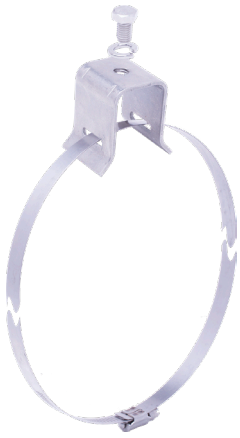
TSO



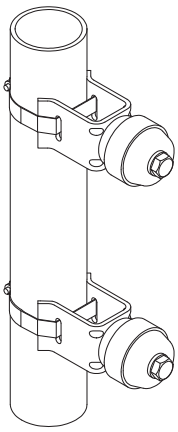
TSOM

Tower Standoffs with Hose Clamp

Part No.	Band Clamp Included	Round Member Size O.D.	Approx. Each Wt. (lbs.)	Pieces Per Part No.
TSOC.75/1.75	Yes	.75" - 1.75"	2.5	10
TSOC2/2.75	Yes	2" - 2.75"	3.5	10
TSOC3/3.75	Yes	3" - 3.75"	3.8	10
TSOC4/4.75	Yes	4" - 4.75"	3.8	10
TSOC5/5.75	Yes	5" - 5.75"	4	10
TSOC6/6.75	Yes	6" - 6.75"	4	10



Insulated Tower Standoff for Round Members
TSOINS Series



- The fast, easy and economical way to make a quality isolated coaxial ground bar mount to round tower members.
- Manufactured from 300 series stainless steel for optimum compatibility.
- 3/8" x 1-1/2" insulator with 3/8-16 x 5/8" stainless steel hex head cap screw and lock washer included.
- Available with or without stainless steel hose clamps in a variety of sizes.

Insulated Tower Standoffs

Part No.	Band Clamp Included	Approx. Each Wt. (lbs.)	Pieces Per Part No.
TSOINS	No	5	10
TSOMINS	No	4.8	10

- TSOINS uses Tower Standoff TSO.
- TSOMINS uses Tower Standoff TSOM.

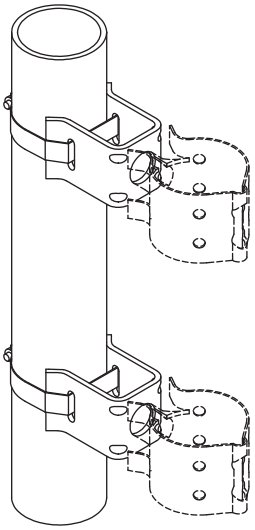


Insulated Tower Standoffs with Hose Clamp

Part No.	Band Clamp Included	Round Member Size O.D.	Approx. Each Wt. (lbs.)	Pieces Per Part No.
TSOCINS.75/1.75	Yes	.75" - 1.75"	6.3	10
TSOCINS2/2.75	Yes	2" - 2.75	6.3	10
TSOCINS3/3.75	Yes	3" - 3.75"	6.3	10
TSOCINS4/4.75	Yes	4" - 4.75"	6.5	10
TSOCINS5/5.75	Yes	5" - 5.75"	6.5	10
TSOCINS6/6.75	Yes	6" - 6.75"	6.5	10



Tower Standoff for Snap-Ins
TSOSI Series

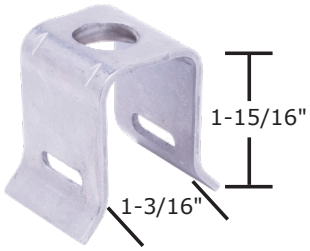


- The fast, easy and economical way to provide snap-in mounting of coaxial cables to round tower members.
- Manufactured from 300 series stainless steel for optimum compatibility.
- 3/4" hole for snap-in. Snap-In not included.
- Available with or without stainless steel hose clamps in a variety of sizes.

Tower Standoffs for Snap-Ins

Part No.	Band Clamp Included	Approx. Each Wt. (lbs.)	Pieces Per Part No.
TSOSI	No	2.8	10

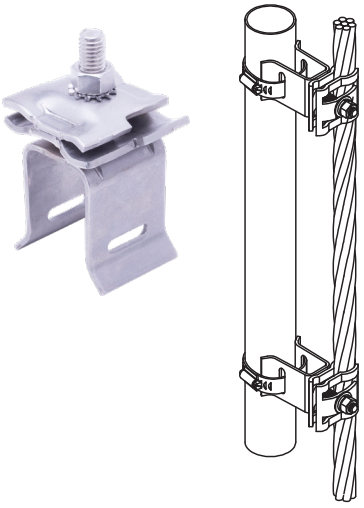
- Snap-In not included.



Stainless Steel Down Conductor Standoff

Part No.	Approx. Each Wt. (lbs.)	Pieces Per Part No.
SSDCSO	2.8	5

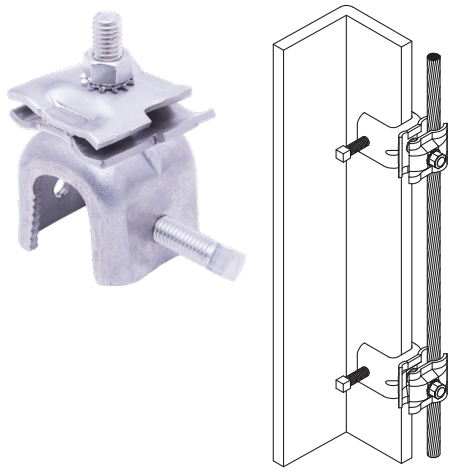
- Range taking down conductor cable clamp with tower standoffs.
- Fast, easy and economical way to attach down conductors to round tower members.
- The small side of the clamp accommodates bare stranded conductors from #6 up to 2/0 AWG while the large side accommodates from 2/0 to 4/0 AWG.
- The small side of the clamp accommodates insulated conductors from #8 up to 2/0 AWG while the large side accommodates from #1 up to 4/0 AWG.
- Manufactured from stainless steel to allow use with any type of wire.
- Available with stainless steel band clamp.



Stainless Steel Down Conductor Angle Adapter

Part No.	Approx. Each Wt. (lbs.)	Pieces Per Part No.
SSDCAA	4	5

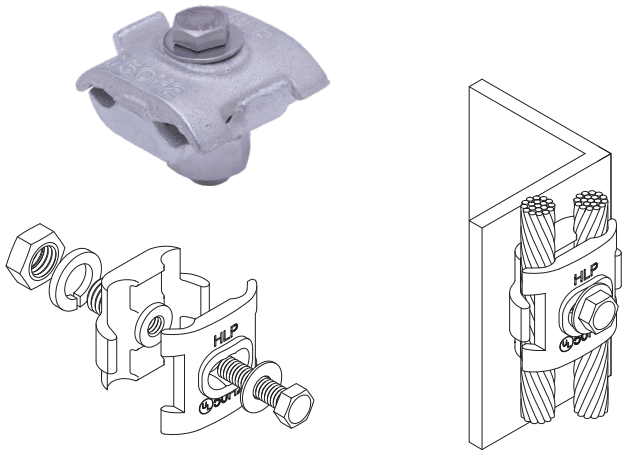
- Range taking down conductor cable clamp with tower standoff.
- Designed to attach to flat steel tower members.
- Fast, easy and economical way to attach down conductors to flat tower members.
- The small side of the clamp accommodates bare stranded conductors from #6 up to 2/0 AWG while the large side accommodates from 2/0 to 4/0 AWG.
- The small side of the clamp accommodates insulated conductors from #8 up to 2/0 AWG while the large side accommodates from #1 up to 4/0 AWG.
- Manufactured from stainless steel to allow use with any type of wire.



Banjo Clamp

Part No.	Approx. Each Wt. (lbs.)
BJC	0.5

- Tinned bronze clamp attaches lightning conductor cable to lattice towers.
- Accepts up to 4/0 AWG conductor.
- 1/2" external hub fits into most banjo brackets.



Slotted Long Barrel Compression Lugs (Telecommunications)



Has Inspection Port

c UL us Listed 467
Listed 486



No Inspection Port



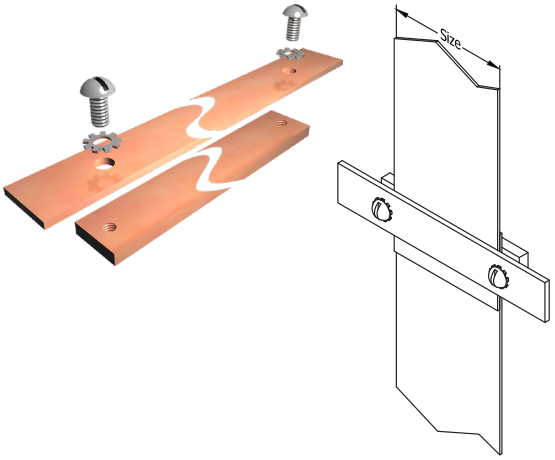
Part No.	Conductor Size (AWG)	Hole Spacing Range	Hardware Size	Inspection Port	Color Codes
GECLB62BC	6	.75" to 1"	3/8"	Yes	Blue
GECLB62BC250BK*	6	.75" to 1"	3/8"	Yes	Blue
GECLB62BCNP	6	.75" to 1"	3/8"	No	Blue
GECLB62BCNP250BK*	6	.75" to 1"	3/8"	No	Blue
GECLB22BCS	2 Sol.	.75" to 1"	3/8"	Yes	White
GECLB22BCS250BK*	2 Sol.	.75" to 1"	3/8"	Yes	White
GECLB22BCSNP	2 Sol.	.75" to 1"	3/8"	No	White
GECLB22BCSNP250BK*	2 Sol.	.75" to 1"	3/8"	No	White
GECLB22BC	2	.75" to 1"	3/8"	Yes	Brown
GECLB22BC250BK*	2	.75" to 1"	3/8"	Yes	Brown
GECLB22BCNP	2	.75" to 1"	3/8"	No	Brown
GECLB22BCNP250BK*	2	.75" to 1"	3/8"	No	Brown

* 250 pack comes in one gallon bucket.

Copper Flat Strap Clamps

Part No.	Strap Size	Approx. Each Wt. (lbs.)
FSC2	2"	5
FSC3	3"	7.5
FSC4	4"	10
FSC6	6"	12.5

- Used for making connection to flat strap or flat braid.
- Copper "sandwich" clamps complete with stainless steel hardware. The top is 1/8" thick and the bottom is 1/4" thick.
- Ends are designed to allow for exothermically welding conductors to clamp.



Lightning Arrestor Kits

Index

Description	Page
Lightning Arrestor Kits	232

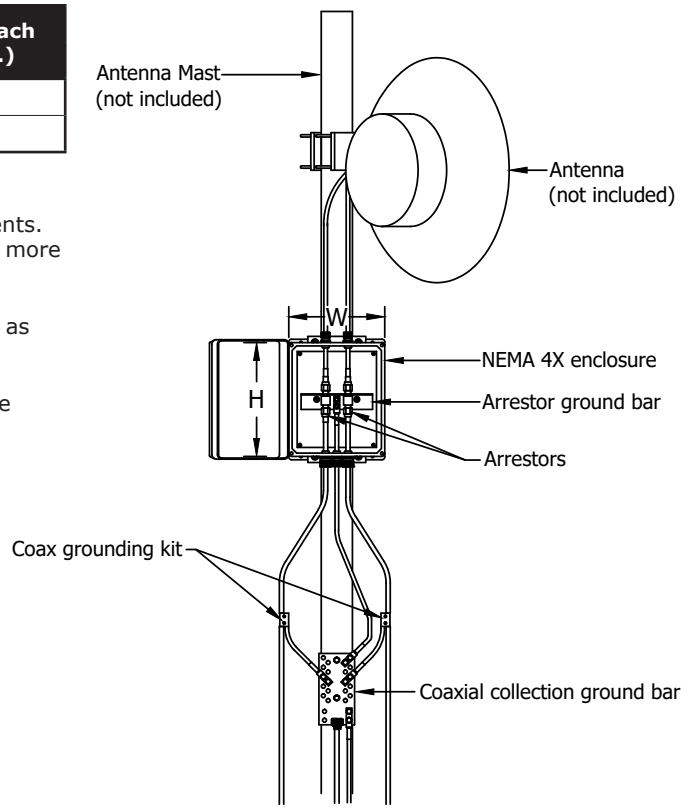
Lightning Arrestor Kits

Part No.	Size			Approx. Each Wt. (lbs.)
	H	W	D	
LABA42A2GKCGB	12"	10"	5"	20
LABB42A2GKCGB	16"	14"	6"	20

- Enclosure provides watertight environment for both surge arrestors and connectors.
- Surge arrestors protect against lightning induced surge currents.
- Lightning arrestor ground bar design allows the addition of 2 more arrestors.
- Coax ground kits provide low impedance ground path.
- Coax ground bar provides ground point for coax lines as well as antenna mount.

Kit Includes:

(1) NEMA 4X molded fiberglass reinforced polyester enclosure
(2) Premounted bi-directional surge arrestors
(1) Lightning arrestor ground bar
(2) Coax ground kits
(1) Coax ground bar

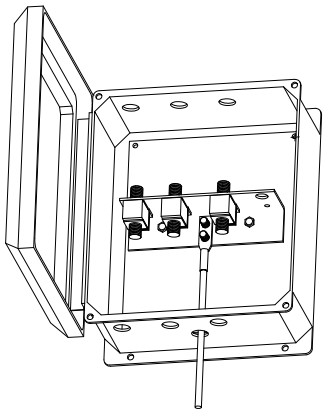


Part No.	Size			Approx. Each Wt. (lbs.)
	H	W	D	
LAB12106XO	12"	10"	6"	24

- Enclosure provides watertight environment for both surge arrestors and connectors.
- Surge arrestors protect against lightning induced surge currents.
- Lightning arrestor ground bar design allows the addition of 1 more arrestor.
- Coax ground kits provide low impedance ground path.
- Coax ground bar provides ground point for coax lines as well as antenna mount.

Kit Includes:

(1) NEMA 4X molded fiberglass reinforced polyester enclosure
(3) Premounted bi-directional surge arrestors
(1) Lightning arrestor ground bar
(3) Coax ground kits
(1) Coax ground bar



NEMA 4X enclosure

APPLICATION NOTE:

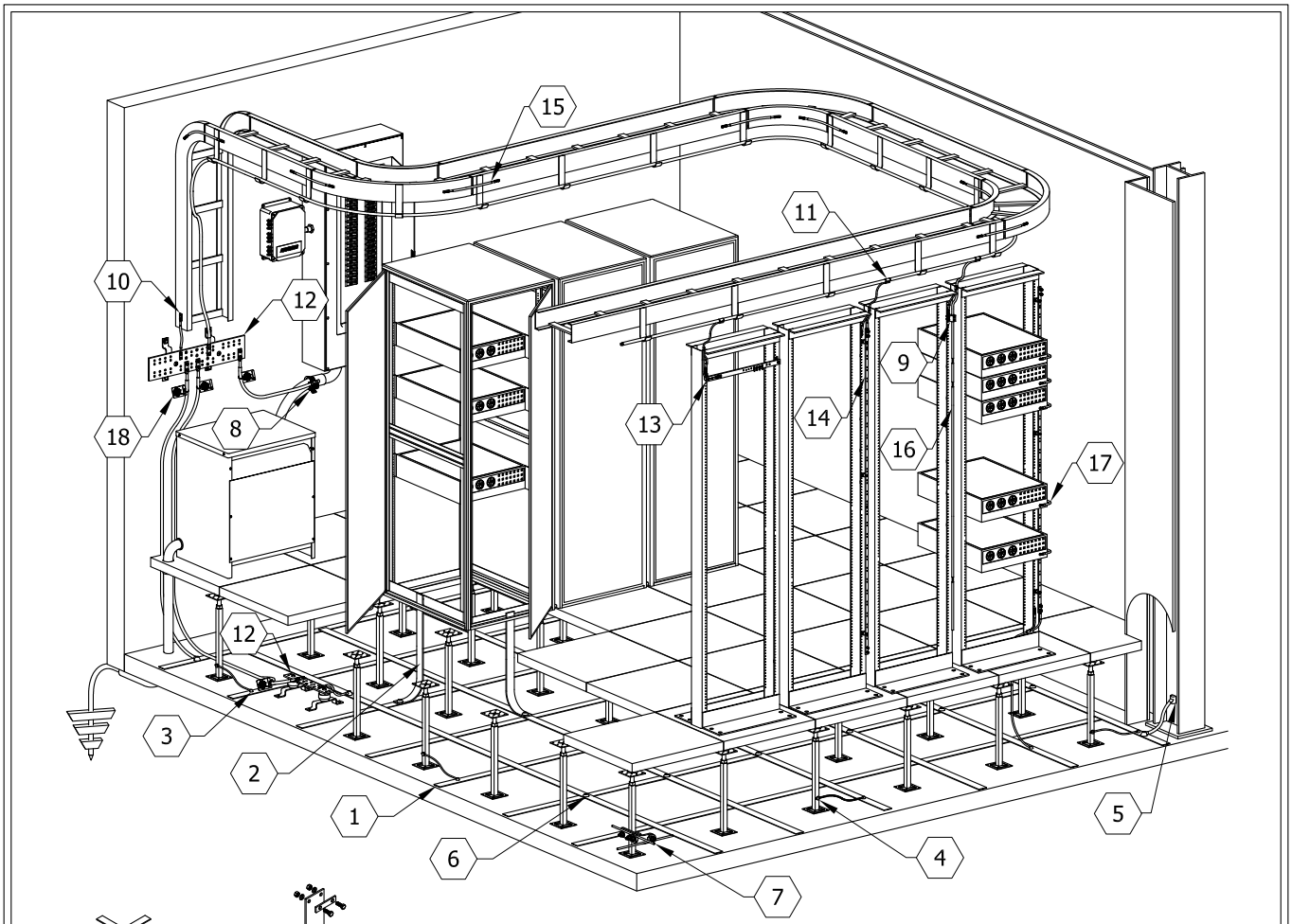
- Lightning arrestor box kits are used in wireless rooftop communication applications such as broadband point to point, point to multi-point and other similar type systems.

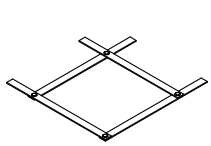
Premise Wiring/Data-Com

Index

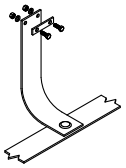
Description	Page
Data-Com Grounding & Bonding Applications	234
Data-Com Grounding & Bonding Equipment	235

Data-Com Grounding & Bonding Applications

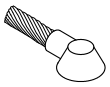




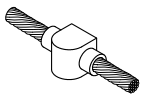
1 Signal Reference Grid



2 Low Impedance Riser



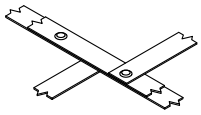
3 BCF ULTRAWELD Connection



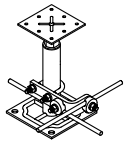
4 VHO ULTRAWELD Connection



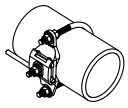
5 VA ULTRAWELD Connection



6 SRG ULTRAWELD Connection



7 GPC Pedestal Clamp



8 CPC Pipe Clamp



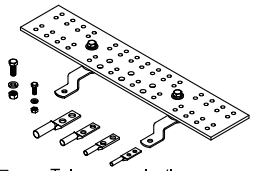
9 LI2/0142 Dual Rated Lay-In Lug



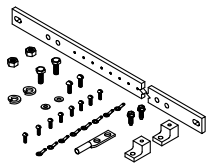
10 GECLB Compression Lug



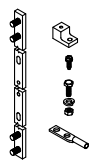
11 CT C-Tap



12 Telecommunication Ground Bar

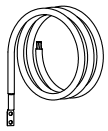


13 RGBHKIT Horizontal Rack Ground Bar



14 RGBVKIT Vertical Rack Ground Bar

15 Insulated Ground Jumper



16 RGJ Rack Ground Jumper

17 Unit Bonding Conductor

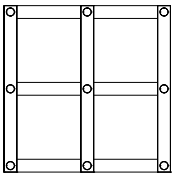


18 Network Building Ground Tag

HARGER®
LIGHTNING PROTECTION•GROUNDING•EXOTHERMIC
301 ZIEGLER DRIVE GRAYSLAKE, IL
60030 (847) 548-8700

Data-Com Grounding & Bonding Applications

Data-Com Grounding & Bonding Equipment

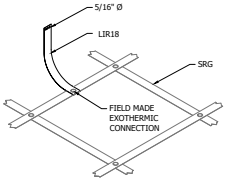


Listed 467

1: Supplementary Bonding Grids

Part No.	Description
SRG105024	10' x 50', 24" O.C. Spacing
SRG125024	12' x 50', 24" O.C. Spacing

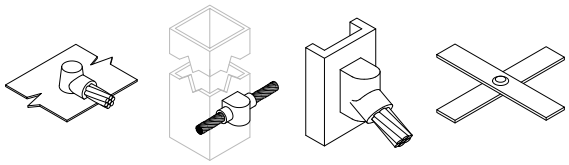
- 2" x .016" flat copper conductor
- See Pages 86 & 87 for more information.



2: Low Impedance Risers & Kits

Part No.	Material	Length	Riser or Kit
LIR18	2" x .016" Flat Copper	18"	Riser
LIR18KIT	2" x .016" Flat Copper	18"	Kit
LIR24	2" x .016" Flat Copper	24"	Riser
LIR24KIT	2" x .016" Flat Copper	24"	Kit

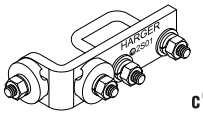
- See Page 88 for more information.

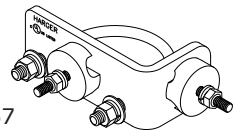


3, 4, 5, 6: Ultraweld Connections Low Emission Exothermic Molds

Part No.	Description	Weld Metal	Required Handle
BCF61.5016B	#6 Str. to SRG Strip	US25	MH1
VHO61SQB	#6 Str. to 1" Square Pedestal	US25	MH1
VA6B	#6 to Vertical Flat Steel	US45	MH1
SRG2016K	SRG to SRG Weld	US32	MH1

- For other SRG connections, contact factory.
- For low smoke requirements, a USSKIT (page 301) is required to convert standard UltraShot molds into LOsmoke molds using UltraShot weld metal only.



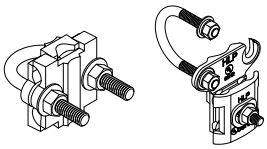


Listed 467

7: GPC Pedestal Clamps

Part No.	U-Bolt Type	Pedestal Size	Conductor Size
GPC6SQ	Square	1" (1-1/8" OD)	#6 AWG
GPC6RD	Round	1" (1-1/8" OD)	#6 AWG
GPC4SQ	Square	1" (1-1/8" OD)	#4 AWG
GPC4RD	Round	1" (1-1/8" OD)	#4 AWG
GPC2SQ	Square	1" (1-1/8" OD)	#2 AWG
GPC2RD	Round	1" (1-1/8" OD)	#2 AWG
GPC2/0RD1.75	Round	1-1/8" - 1-3/4"	2/0 & #6 AWG

- See Page 90 for more information.

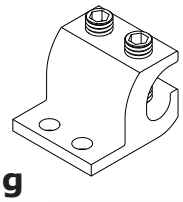


Listed 467
Listed 96

8: Pipe Clamps

Part No.	Material	Nom. Pipe Size Range	Pipe Outside Diameter
CPC.5/.75	Tinned Bronze	.5" - .75"	0.375" - 1"
CPC1/1.25	Tinned Bronze	1" - 1.25"	0.9375" - 1.7"
CPC1.5/2	Tinned Bronze	1.5" - 2"	1.25" - 2.4"
CPC2.5/3	Tinned Bronze	2.5" - 3"	2.5" - 3.5"
CPC3.5/4	Tinned Bronze	3.5" - 4"	3.375" - 4.5"
CPC5/6	Tinned Bronze	5" - 6"	4.75" - 6.63"

- See Page 127 & 200 for more information.



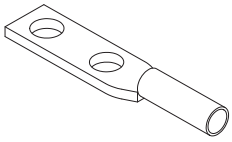
Listed 486

9: Lay-In Lug

Part No.	LI2/0142
Size	1-5/8" x 1-1/2"
Material	Electro-tin Plated Aluminum (6061-T6)
Accepts Conductors	2/0 to #14 AWG
Includes	(2) 3/8" x 1" Hex Socket Set Screws
Requires	3/16" Hex Key (not included)
Features	Dual Rated, UL486B Listed

- See Page 120 for more information.

Data-Com Grounding & Bonding Equipment

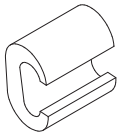


c UL us Listed 467
Listed 486

10: GECLB Compression Lugs

Part No.	Cable Size	O.C. Dim. B/T Holes	Hardware Size	Color Code
GECLB62A	6	5/8"	1/4"	Blue
GECLB62C	6	1"	3/8"	Blue
GECLB22A	2	5/8"	1/4"	Brown
GECLB22C	2	1"	3/8"	Brown
GECLB1/02C	1/0	1"	3/8"	Pink
GECLB2/02C	2/0	1"	3/8"	Black
GECLB3/02C	3/0	1"	3/8"	Orange
GECLB4/02C	4/0	1"	3/8"	Purple

• See Page 115 for more information.

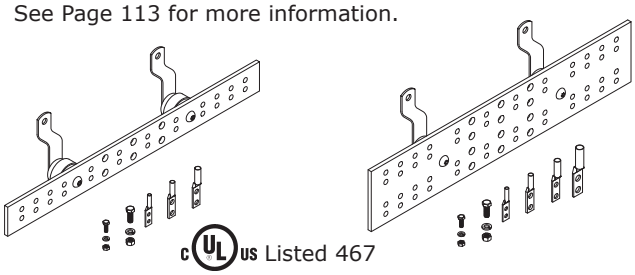


Listed 486
Listed 467

11: Heavy Duty C-Taps

Part No.	Conductor Run	Conductor Tap
CT2248	#2 Stranded #2 Solid	#4 Stranded #8 Solid
CT2222	#2 Stranded #2 Solid	#2 Stranded #2 Solid

• See Page 113 for more information.

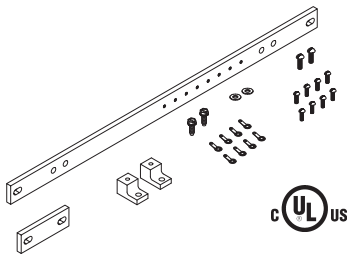


c UL us Listed 467

12: Telecommunication Ground Bars & Kits

Part No.	Bar Size	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Bar or Kit
GBI1426TGB	1/4" x 2" x 6"	2	2	Bar
GBI1426TGBKT	1/4" x 2" x 6"	2	2	Kit
GBI14212TGB	1/4" x 2" x 12"	6	3	Bar
GBI14212TGBKT	1/4" x 2" x 12"	6	3	Kit
GBI14412TMGB	1/4" x 4" x 12"	12	6	Bar
GBI14412TMGBKT	1/4" x 4" x 12"	12	6	Kit
GBI14420TMGB	1/4" x 4" x 20"	24	6	Bar
GBI14420TMGBKT	1/4" x 4" x 20"	24	6	Kit

• Kit includes lugs and hardware.

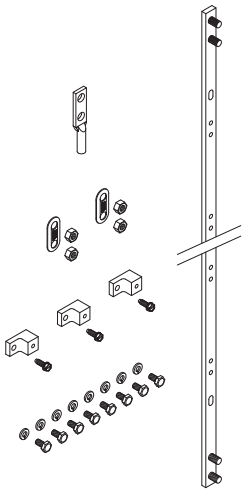


c UL us Listed 467

13: Horizontal Rack Ground Bars & Kits

Part No.	Bar Size	Bar or Kit
RGBH14119.25	1/4" x 1" x 19-1/4"	Bar
RGBHKIT14119.25	1/4" x 1" x 19-1/4"	Kit
RGBH14123.25	1/4" x 1" x 23-1/4"	Bar
RGBHKIT14123.25	1/4" x 1" x 23-1/4"	Kit
RGBH14135.25	1/4" x 1" x 35-1/4"	Bar
RGBHKIT14135.25	1/4" x 1" x 35-1/4"	Kit

• Bar includes splice plate. Kit includes splice plate, mounting hardware and ring terminals.
• See Pages 68 & 69 for more information.



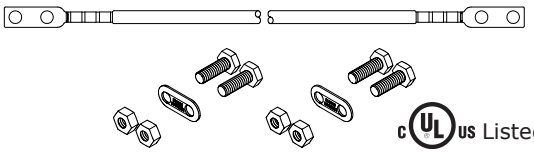
c UL us Listed 467

14: Vertical Rack Ground Bars & Kits

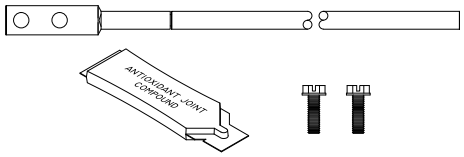
Part No.	Bar Size	Bar or Kit
RGBV145836A	1/4" x 5/8" x 36"	Bar
RGBVKIT145836A	1/4" x 5/8" x 36"	Kit
RGBV145872A	1/4" x 5/8" x 72"	Bar
RGBVKIT145872A	1/4" x 5/8" x 72"	Kit

• Kit includes lug and all necessary hardware.
• See Page 70 for more information.

Data-Com Grounding & Bonding Equipment



c UL us Listed 467



15: Insulated Ground Jumpers & Kits

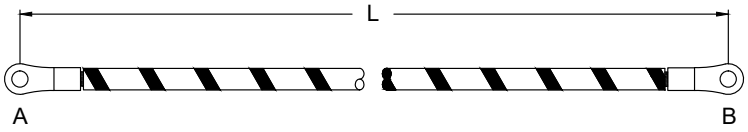
Part No.	Conductor Type	Length	No. of Holes Per Side	On Center Spacing	Hole Size	Jumper or Kit
GJ67G82A1/4	67G	8"	2	5/8"	1/4"	Jumper
GJ67G82A1/4KIT	67G	8"	2	5/8"	1/4"	Kit
GJ67G102A1/4	67G	10"	2	5/8"	1/4"	Jumper
GJ67G102A1/4KIT	67G	10"	2	5/8"	1/4"	Kit
GJ67G122A1/4	67G	12"	2	5/8"	1/4"	Jumper
GJ67G122A1/4KIT	67G	12"	2	5/8"	1/4"	Kit

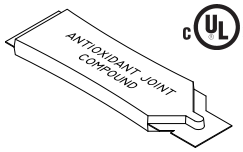
- #6 AWG x 7 Strand Green THW2 insulation.
- Kit includes all necessary hardware.
- See Page 106 for more information.

16: Rack Bonding Jumper Kit

Part No.	RGJ67G1082AKIT
Conductor Type	#6 AWG x 7 Strand THW Green
Conductor Length	9 ft.
No. of Holes	2
Hole Size	1/4"
On Center Spacing	5/8"

- Kit includes (2) screws (SMS0126SHWZ) and (1) antioxidant (HAAJC1/2).





c UL us Listed 467

17: One Hole Unit Bonding Conductor Kits

Part No.	Conductor Type	Length	No. of Holes Per Side	Hole Size A	Hole Size B
UBC61411/4KIT5	6MTWG/YS	14	1	1/4"	1/4"
UBC61411/410KIT5	6MTWG/YS	14	1	1/4"	#10
UBC61811/4KIT5	6MTWG/YS	18	1	1/4"	1/4"
UBC61811/410KIT5	6MTWG/YS	18	1	1/4"	#10
UBC63211/4KIT5	6MTWG/YS	32	1	1/4"	1/4"
UBC63211/410KIT5	6MTWG/YS	32	1	1/4"	#10
UBC63811/410KIT5	6MTWG/YS	38	1	1/4"	#10

- Conductor type is #6 MTW wire with Green insulation and yellow spiral stripe.
- Kit includes (5) jumpers and (1) antioxidant (HAAJC1/2).

18: Network Building Ground Tag

Part No.	Material
GRNTAG607PK10	Plastic

- Dimensions are 2.125" x 3.75".
- Yellow tag with green text.
- Tag is UV Resistant.



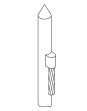
Exothermic Connections

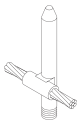
Index

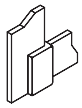
Description **Page**

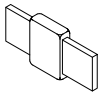
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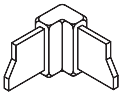
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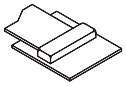

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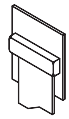

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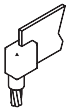

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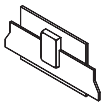

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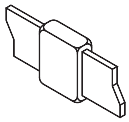

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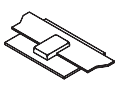

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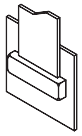

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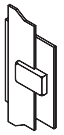

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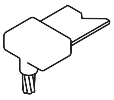

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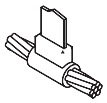

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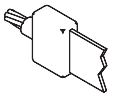

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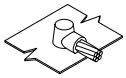

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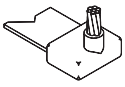

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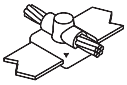

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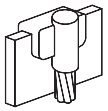

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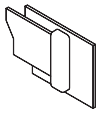

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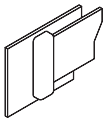

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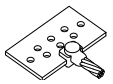

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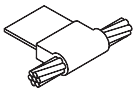

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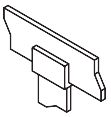

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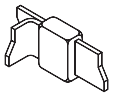

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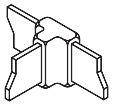

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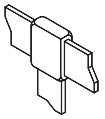

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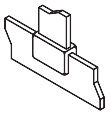

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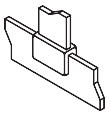

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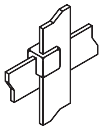

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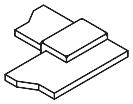

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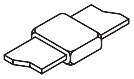

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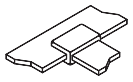

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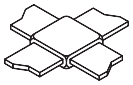

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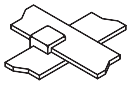

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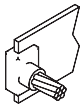

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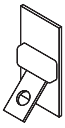

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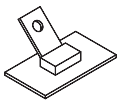

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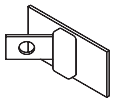
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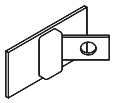

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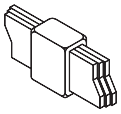

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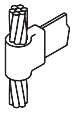

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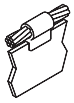

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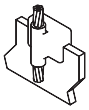

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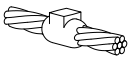

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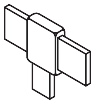

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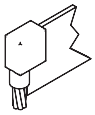

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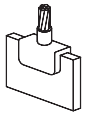

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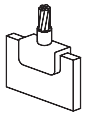

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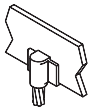

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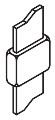

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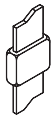

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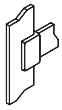

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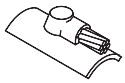

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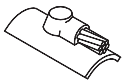

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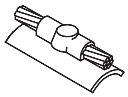

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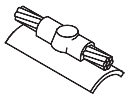

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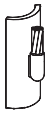

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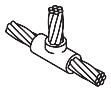

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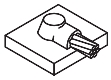

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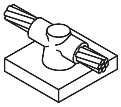

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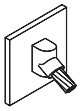

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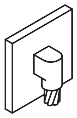

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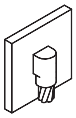

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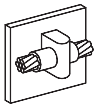

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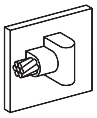

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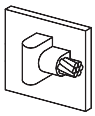

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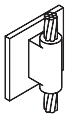

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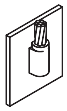

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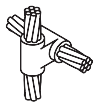

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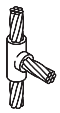

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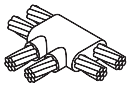
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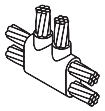

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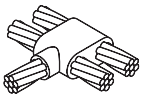

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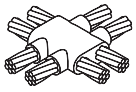

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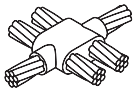

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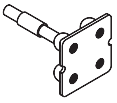

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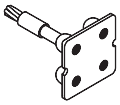

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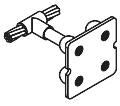

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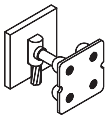

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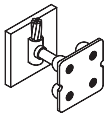

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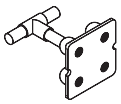

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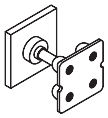

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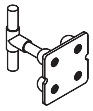

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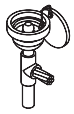

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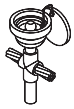

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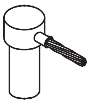

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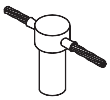

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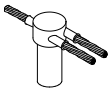

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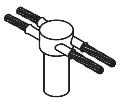

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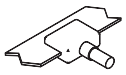

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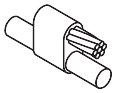

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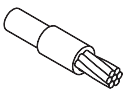

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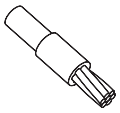

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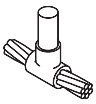

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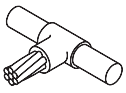

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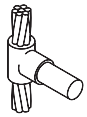

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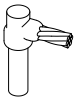

GCH


GCT

Connection Types


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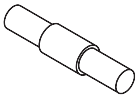

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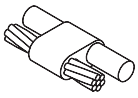

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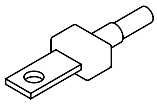

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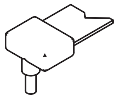

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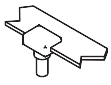
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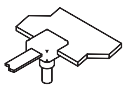

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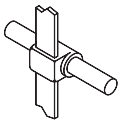

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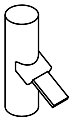

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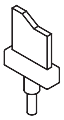

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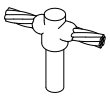

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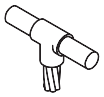

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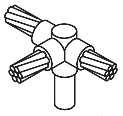

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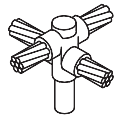

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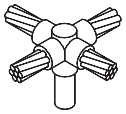

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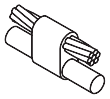

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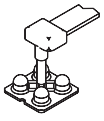

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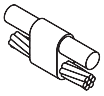

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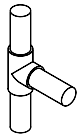

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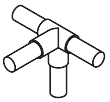

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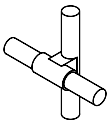

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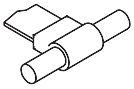

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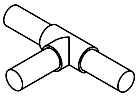

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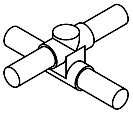

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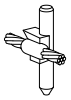

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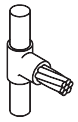

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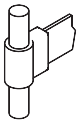

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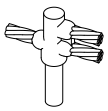

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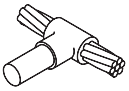

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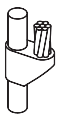

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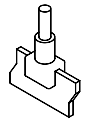

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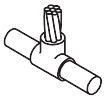

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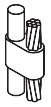

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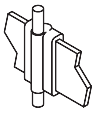

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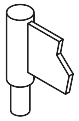
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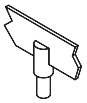

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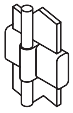

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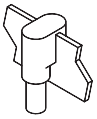

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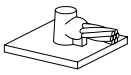

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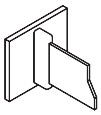

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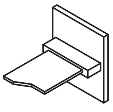

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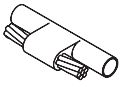

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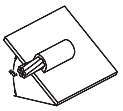

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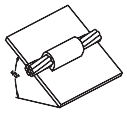

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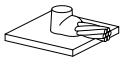

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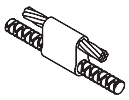

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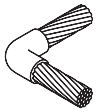

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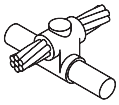

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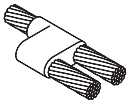

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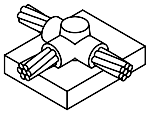

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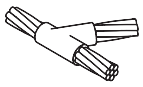

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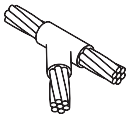

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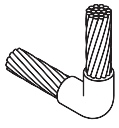

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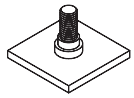

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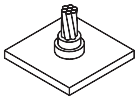

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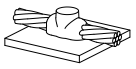

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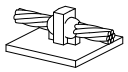

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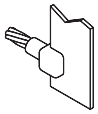

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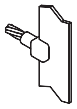

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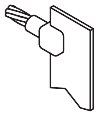

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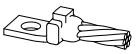

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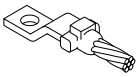

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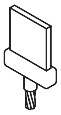

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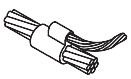

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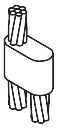

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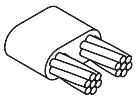

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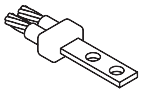

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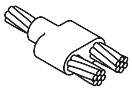

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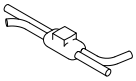
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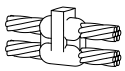

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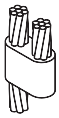

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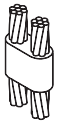

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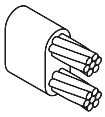

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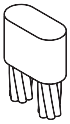

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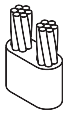

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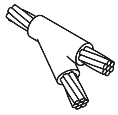

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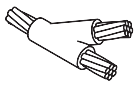

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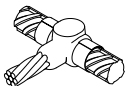

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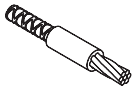

PVDD


PVDU


RATD


RATU

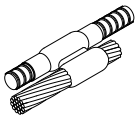

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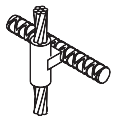

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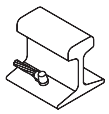

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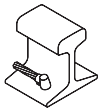

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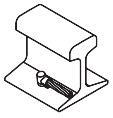

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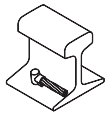

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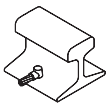

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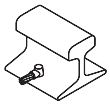

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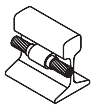

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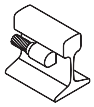

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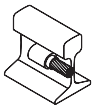

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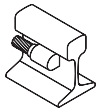

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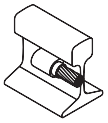

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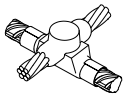

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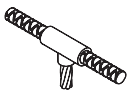

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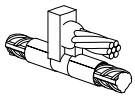

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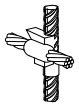

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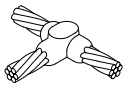

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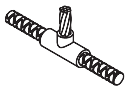

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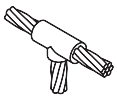

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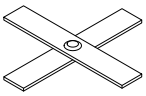

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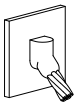

RT

Connection Types


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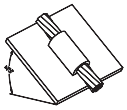

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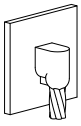

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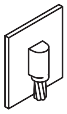

VA


VBS

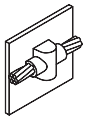

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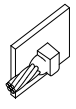

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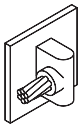

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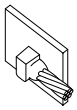

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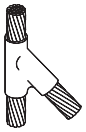

VH


VHO


VL


VLO


VR


VR45DT


VRCD


VRCT

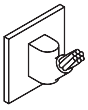

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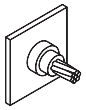

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VRV45T


VRVCAD

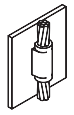

VRVCAU


VSAU

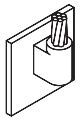

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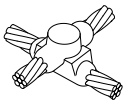

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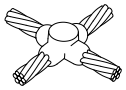

VT


VTO


VU


VUO


XO


XX

Exothermic Process

The Exothermic Process is an effective and safe method of welding copper to copper or copper to steel for the purpose of producing permanent electrical connections. Exothermically welded connections are produced from the energy and molten copper metal liberated from an exothermic reaction between powdered copper oxide and aluminum. The exothermic reaction takes place at a theoretical temperature of 4600°F and as a result, molten copper alloy is created and used to melt the conductors and cast the finished connection. The exothermic reaction takes place in a semi-permanent graphite mold that will last 50 or more welds if properly maintained. The process is simple and easy to implement providing an on-site means to make welded electrical connections without requiring external power, equipment or the special training usually required for brazing and welding. The process will provide a finished connection that is permanent, maintenance free, and will not increase in resistance. The finished connection also provides an ampacity that exceeds that of the conductors being joined.

Main Components of an Exothermic Connection



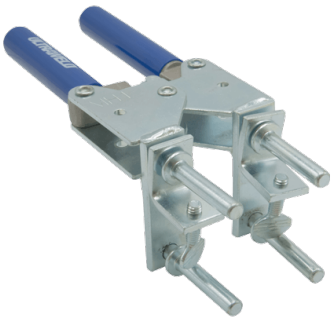
DRONE



Weld Metal



Mold

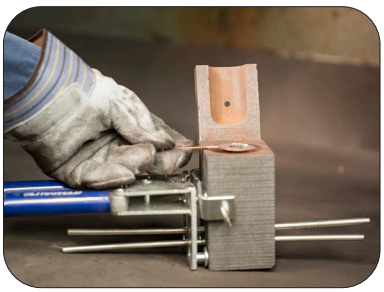


Handle

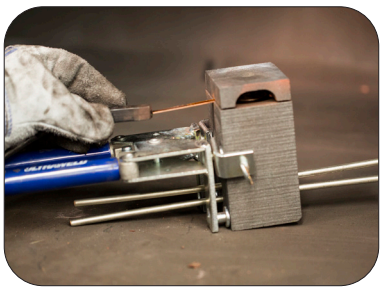
UltraShot Drop-In Process



Step 1:
Dry and clean the mold and conductor.



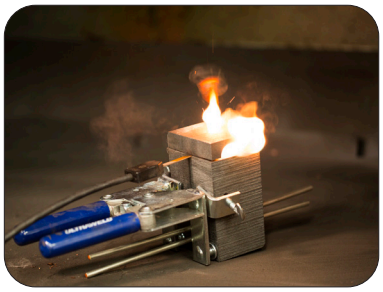
Step 2:
Place conductors and UltraShot cartridge into mold.



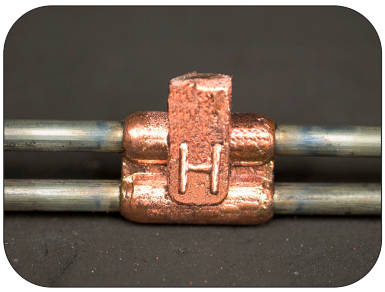
Step 3:
Close the lid and attach DRONE cord to the UltraShot igniter.



Step 4:
Push and hold both igniter buttons at the same time.



Step 5:
Reaction is made, open mold to remove connection and clean mold before next connection.



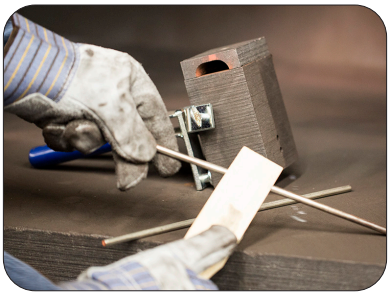
A completed UltraShot connection

NOTES:
- When exothermic welding, always wear proper clothing, safety glasses and gloves.
- Harger offers Ultraweld training and certification.
- Contact the factory for more information.

NuwTube Pour & Shoot Process



Step 1:
Torch dry the mold before making the first connection.



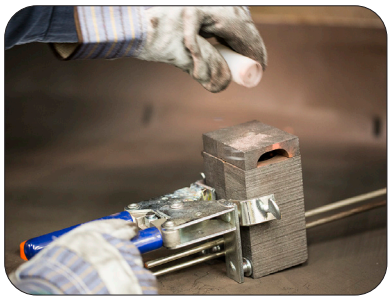
Step 2:
Clean and dry conductors, insert conductor into mold, close handle clamp and lock mold.



Step 3:
Insert disk into mold.



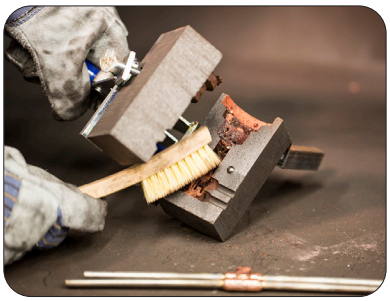
Step 4:
Remove Clear cap from NuwTube, pour weld metal into mold.



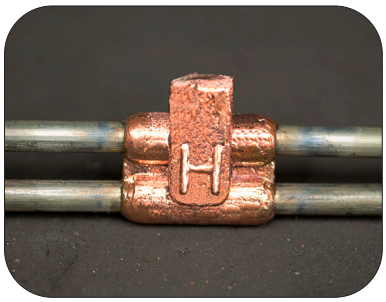
Step 5:
Close lid, remove Orange cap from starting powder chamber and sprinkle next to ignition hole.



Step 6:
Ignite material located on top of the lid using a flint igniter (FLTIG).



Step 7:
After the connection is complete, open the mold and remove the connection, remove slag and clean mold before making the next connection.



Complete NuwTube connection

NOTES:

- When exothermic welding, always wear proper clothing, safety glasses and gloves.
- Harger offers Ultraweld training and certification.
- Contact the factory for more information.

UltraShot Controllers

- UltraShot is a copper drop-in cartridge that is consumed during the exothermic reaction process initiated by the DRONE.
- Cartridge is consumed leaving minimal waste.
- Reliable ignition process allows for little downtime.

Controller

Part No.	Approx. Each Wt. (lbs.)
DRONE	1



- Exclussive hand held ignitor for UltraShot weld metal.
- Includes a six-foot cord with quick latch disconnect.
- Utalizes a Milwaukee M18 REDLITHUM battery.
- Audible ignition alert.
- LED indicates ignition.

Controller with Accessory Kit

Part No.	Approx. Each Wt. (lbs.)
DAK	17.3



Kit Includes:

(1) MIL1820BAT - Milwaukee M18 REDLITHIUM battery
(1) MIL1812CHARGER - Milwaukee M18 & M12 Multi-Voltage charger
(1) DRONECASE - Storage case for DRONE, Battery, Charger, and Cord

Accessory Kit

Part No.	Approx. Each Wt. (lbs.)
DRONEKIT	6.5



Kit Includes:

(1) DRONE - Compact UltraShot Controller
(1) MIL1820BAT - Milwaukee M18 REDLITHIUM battery
(1) MIL1812CHARGER - Milwaukee M18 & M12 Multi-Voltage charger
(1) DRONECASE - Storage case for DRONE, Battery, Charger, and Cord

UltraShot Controller Accessories

DRONE Cords

Part No.	Description	Approx. Each Wt. (lbs.)
DRONECORD	6' Drone Cord	0.2
DRONECORD15	15' Drone Cord	0.2

- Allows for flexibility in tight spaces as well as maintaining a safe distance from the reaction.



Drone Cord

Milwaukee M18 REDLITHIUM Battery

Part No.	Approx. Each Wt. (lbs.)
MIL1820BAT	1.5

- 18 volt battery featuring a built-in fuel gauge.
- Utilized by the DRONE.



Milwaukee Charger

Part No.	Approx. Each Wt. (lbs.)
MIL1812CHARGER	2

- Accepts M18 & M12 battery packs.



DRONE Storage

Part No.	Approx. Each Wt. (lbs.)
DRONECASE	5
DRONEPOUCH	0.3

- DRONECASE storage case for DRONE, Battery, Charger and Cord (not included).
- DRONEPOUCH easily transports the DRONE hands-free from connection to connection.



DRONECASE



DRONEPOUCH

Weld Metal

UltraShot

- Electronically ignited using the DRONE.
- The weld metal is packaged in individual, moisture resistant copper drop-ins.
- Cartridge is consumed leaving minimal waste..
- Each drop-in is marked with the size.
- Sold in carton quantity.



UltraShot (Drop-In)

Size	Qty. Per Carton
US25	20
US32	20
US45	20
US65	20
US90	10
US115	10
US150	10
US200	10
US250	10
US300	10
US400	5
US500	5
US600	5
US750	5

UltraShot Box Kit

Part No.	Approx. Each Wt. (lbs.)
USBOXKIT	10.5

- Convenient and rugged exothermic UltraShot storage.
- 20-1/16" long x 8-7/16" wide x 9-7/16" tall
- 20 gauge electrostatically painted steel box, central lockable clasp.
- 3 stackable aluminum trays included to store Harger UltraShot size range 25-300.
- UltraShot not included.
- Additional trays are available.

Kit Includes:

(1) USBOX Storage Box
(1) USSBT25/65 Storage Tray
(1) USSBT90/200 Storage Tray
(1) USSBT250/300 Storage Tray



USBOX & Storage Trays

Part No.	Description	For UltraShot Sizes	Total Shot Capacity	Approx. Each Wt. (lbs.)
USBOX	Storage Box	n/a	n/a	5.5
USSBT25/65	Storage Tray	25 - 65	32	1.5
USSBT90/200	Storage Tray	90 - 200	18	1.5
USSBT250/300	Storage Tray	250 - 300	18	1.5
USSBT400/500	Storage Tray	400 - 500	12	1.5

Weld Metal

NuwTube

- The weld metal is packaged in individual, moisture resistant plastic tubes.
- Dual chamber design holds starting material and weld metal separately, in the same tube.
- Easy to identify with color coded caps.
  Clear = Weld Metal
  Orange = Starting Material.
- Each cartridge is marked with the size.
- Each carton also contains metal disks. One metal disk is used for each connection.
- Sold in carton quantity.

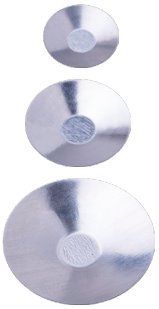


NuwTube (Pour & Shoot)

Size	Qty. Per Carton
NUWTUBE15	20
NUWTUBE25	20
NUWTUBE32	20
NUWTUBE45	20
NUWTUBE65	20
NUWTUBE90	10
NUWTUBE115	10
NUWTUBE150	10
NUWTUBE200	10
NUWTUBE250	10

Disks

Part No.	Description	Diameter	Approx. Box Wt. (lbs.)	Pieces Per Part No.
DISK15/65	Used in molds using 15 - 65 weld metal	3/4"	0.1	20
DISK90/115	Used in molds using 90 - 115 weld metal	1"	0.1	10
DISK150/500	Used in molds using 150 - 250 weld metal	1-1/2"	0.3	10



- The disk rests on the bottom of the crucible and holds the weld metal powder in place until the reaction occurs.
- A new disk is required each time a weld is made.
- Disks are included with the NuwTube Weld Metal.

Disk Kit

Part No.	Approx. Each Wt. (lbs.)
DISKKIT1	0.3

- A Disk Kit contains three sizes of steel disks; 60 small, 30 medium and 30 large.



Ultraweld Tech Support App



Ultraweld Exothermic Welding Process
Ultraweld creates permanent, maintenance free electrical connections that typically outlast both the conductor and the elements they join. These high-performance bonds are engineered for durability and reliability in even the most demanding environments. To support proper installation, molds are equipped with QR codes that link directly to instructional videos and downloadable PDF guides, ensuring you have access to the right information when you need it.

Ultraweld Tech Support App
Tap into Harger's decades of field expertise with the Ultraweld Tech Support App. Designed for both pre-installation and post-installation support, the app helps users troubleshoot and optimize their connections with ease.

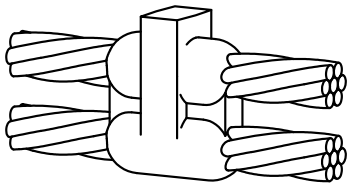
Quickly search by:
- Connection style
- Ignition challenges
- Field issues

Receive targeted guidance on:
- Conductor positioning
- Surface preparation
- Mold preparation
- Troubleshooting finished connections

Cable to Cable

Mold Information:
- Parallel Through Splice of Horizontal Cables, Tap Conductor Over Run
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

PT



c UL us Listed 467
#6 through 250 MCM

PT 4/0 2/0 B

- PT — Style
- 4/0 — Cable Size Run
- 2/0 — Cable Size Tap
- B — Price Key

PT Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
#6	#6	PT66B	US25	NUWTUBE25	MH1
#4	#8 Sol	PT48SB	US32	NUWTUBE32	MH1
	#8	PT48B	US32	NUWTUBE32	
	#6 Sol	PT46SB	US32	NUWTUBE32	
	#6	PT46B	US32	NUWTUBE32	
	#4	PT44B	US32	NUWTUBE32	
#2 Sol	#2 Sol	PT2S2SB	US65	NUWTUBE65	MH1
#2	#8 Sol	PT28SB	US45	NUWTUBE45	MH1
	#8	PT28B	US45	NUWTUBE45	
	#6 Sol	PT26SB	US45	NUWTUBE45	
	#6	PT26B	US45	NUWTUBE45	
	#4	PT24B	US65	NUWTUBE65	
	#2 Sol	PT22SB	US65	NUWTUBE65	
	#2	PT22B	US65	NUWTUBE65	
1/0	#8 Sol	PT1/08SB	US65	NUWTUBE65	MH1
	#8	PT1/08B	US65	NUWTUBE65	
	#6 Sol	PT1/06SB	US65	NUWTUBE65	
	#6	PT1/06B	US65	NUWTUBE65	
	#4	PT1/04B	US65	NUWTUBE65	
	#2 Sol	PT1/02SB	US65	NUWTUBE65	
	#2	PT1/02B	US65	NUWTUBE65	
	1/0	PT1/01/0B	US90	NUWTUBE90	
2/0	#8 Sol	PT2/08SB	US65	NUWTUBE65	MH1
	#8	PT2/08B	US65	NUWTUBE65	
	#6 Sol	PT2/06SB	US90	NUWTUBE90	
	#6	PT2/06B	US90	NUWTUBE90	
	#4	PT2/04B	US90	NUWTUBE90	
	#2 Sol	PT2/02SB	US90	NUWTUBE90	
	#2	PT2/02B	US90	NUWTUBE90	
	1/0	PT2/01/0B	US115	NUWTUBE115	
	2/0	PT2/02/0B	US115	NUWTUBE115	
3/0	#8 Sol	PT3/08SB	US90	NUWTUBE90	MH1
	#8	PT3/08B	US90	NUWTUBE90	
	#6 Sol	PT3/06SB	US90	NUWTUBE90	
	#6	PT3/06B	US90	NUWTUBE90	
	#4	PT3/04B	US115	NUWTUBE115	
	#2 Sol	PT3/02SB	US115	NUWTUBE115	
	#2	PT3/02B	US115	NUWTUBE115	
	1/0	PT3/01/0B	US115	NUWTUBE115	
	2/0	PT3/02/0B	US150	NUWTUBE150	
	3/0	PT-3/03/0B	US150	NUWTUBE150	
4/0	#8 Sol	PT4/08SB	US90	NUWTUBE90	MH1
	#8	PT4/08B	US90	NUWTUBE90	
	#6 Sol	PT4/06SB	US90	NUWTUBE90	
	#6	PT4/06B	US90	NUWTUBE90	
	#4	PT4/04B	US150	NUWTUBE150	
	#2 Sol	PT4/02SB	US150	NUWTUBE150	
	#2	PT4/02B	US150	NUWTUBE150	
	1/0	PT4/01/0B	US150	NUWTUBE150	
	2/0	PT4/02/0B	US150	NUWTUBE150	
	3/0	PT4/03/0B	US200	NUWTUBE200	
	4/0	PT4/04/0B	US200	NUWTUBE200	

Recommended Accessories:

MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

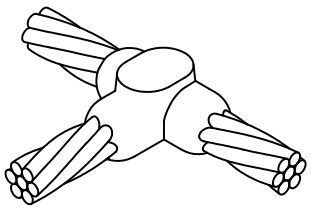
PT Instructions

Cable to Cable

Mold Information:
- Tee of Horizontal Run & Tap Cables
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

Horizontal Split 2-Piece Design

RT



c UL us Listed 467
#6 through 250 MCM

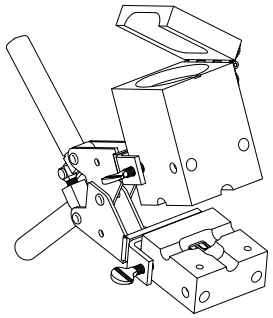
RT Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
#6	#6	RT66B	US32	NUWTUBE32	MH1
#4	#4	RT44B	US32	NUWTUBE32	MH1
#2 Sol	#2 Sol	RT2S2SB	US45	NUWTUBE45	MH1
#2	#6 #4 #2 Sol #2	RT26B RT24B RT22SB RT22B	US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
1/0	#6 #4 #2 Sol #2 1/0	RT1/06B RT1/04B RT1/02SB RT1/02B RT1/01/0B	US45 US45 US45 US45 US90	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE90	MH1
2/0	#6 #4 #2 Sol #2 1/0 2/0	RT2/06B RT2/04B RT2/02SB RT2/02B RT2/01/0B RT2/02/0B	US45 US45 US45 US45 US90 US90	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE90 NUWTUBE90	MH1
3/0	#6 #4 #2 Sol #2 1/0 2/0 3/0	RT3/06B RT3/04B RT3/02SB RT3/02B RT3/01/0B RT3/02/0B RT3/03/0B	US45 US45 US45 US45 US90 US90 US115	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE90 NUWTUBE90 NUWTUBE115	MH1
4/0	#6 #4 #2 Sol #2 1/0 2/0 3/0 4/0	RT4/06B RT4/04B RT4/02SB RT4/02B RT4/01/0B RT4/02/0B RT4/03/0B RT4/04/0B	US90 US90 US90 US90 US90 US90 US115 US150	NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE115 NUWTUBE150	MH1

RT 4/0 2/0 B

- RT — Style
- 4/0 — Cable Size Run
- 2/0 — Cable Size Tap
- B — Price Key

Horizontal Split 2-Piece Design



Recommended Accessories:

MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

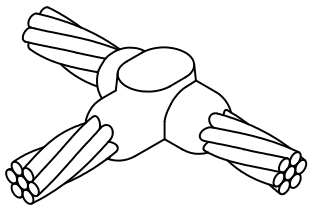
RT Instructions

Cable to Cable

Mold Information:
- Tee of Horizontal Run & Tap Cables
- Three-piece design allows for ease of mold cleaning.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

Vertical & Horizontal Split 3-Piece Design

RT

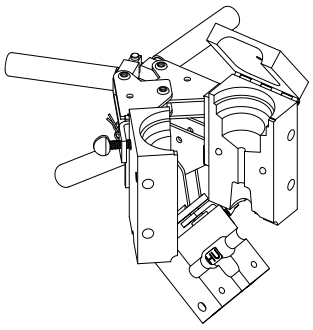


c UL us Listed 467
#6 through 250 MCM

RT 4/0 4/0 I

- RT — Style
- 4/0 — Cable Size Run
- 4/0 — Cable Size Tap
- I — Price Key

Vertical & Horizontal Split 3-Piece Design



Recommended Accessories:

MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

RT Instructions

RT Connection

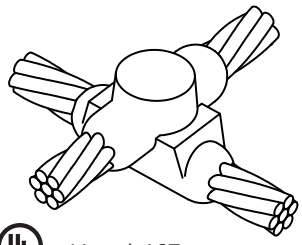
Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
4/0	#6	RT4/06I	US90	NUWTUBE90	MH6
	#4	RT4/04I	US90	NUWTUBE90	
	#2 Sol	RT4/02SI	US90	NUWTUBE90	
	#2	RT4/02I	US90	NUWTUBE90	
	1/0	RT4/01/0I	US90	NUWTUBE90	
	2/0	RT4/02/0I	US90	NUWTUBE90	
	3/0	RT4/03/0I	US115	NUWTUBE115	
	4/0	RT4/04/0I	US150	NUWTUBE150	
250 MCM	#2	RT25CM2I	US90	NUWTUBE90	MH6
	1/0	RT25CM1/0I	US90	NUWTUBE90	
	2/0	RT25CM2/0I	US90	NUWTUBE90	
	3/0	RT25CM3/0I	US150	NUWTUBE150	
	4/0	RT25CM4/0I	US150	NUWTUBE150	
	250 MCM	RT25CM25CMI	US150	NUWTUBE150	
300 MCM	#2	RT3CM2I	US90	NUWTUBE90	MH6
	1/0	RT3CM1/0I	US90	NUWTUBE90	
	2/0	RT3CM2/0I	US90	NUWTUBE90	
	3/0	RT3CM3/0I	US150	NUWTUBE150	
	4/0	RT3CM4/0I	US150	NUWTUBE150	
	250 MCM	RT3CM25CMI	US200	NUWTUBE200	
	300 MCM	RT3CM3CMI	US200	NUWTUBE200	
350 MCM	#2	RT35CM2I	US90	NUWTUBE90	MH6
	1/0	RT35CM1/0I	US90	NUWTUBE90	
	2/0	RT35CM2/0I	US90	NUWTUBE90	
	3/0	RT35CM3/0I	US150	NUWTUBE150	
	4/0	RT35CM4/0I	US150	NUWTUBE150	
	250 MCM	RT35CM25CMI	US200	NUWTUBE200	
	300 MCM	RT35CM3CMI	US200	NUWTUBE200	
	350 MCM	RT35CM35CMI	US200	NUWTUBE200	
500 MCM	#2	RT5CM2I	US90	NUWTUBE90	MH6
	1/0	RT5CM1/0I	US90	NUWTUBE90	
	2/0	RT5CM2/0I	US90	NUWTUBE90	
	3/0	RT5CM3/0I	US150	NUWTUBE150	
	4/0	RT5CM4/0I	US150	NUWTUBE150	
	250 MCM	RT5CM25CMI	US200	NUWTUBE200	
	300 MCM	RT5CM3CMI	US200	NUWTUBE200	
	350 MCM	RT5CM35CMI	US200	NUWTUBE200	
	500 MCM	RT5CM5CMI	US300	(2) NUWTUBE150	
750 MCM	1/0	RT75CM1/0I	US150	NUWTUBE150	MH6
	2/0	RT75CM2/0I	US150	NUWTUBE150	MH6
	3/0	RT75CM3/0I	US150	NUWTUBE150	MH6
	4/0	RT75CM4/0I	US150	NUWTUBE150	MH6
	250 MCM	RT75CM25CMI	US200	NUWTUBE200	MH6
	300 MCM	RT75CM3CMI	US200	NUWTUBE200	MH6
	350 MCM	RT75CM35CMI	US250	NUWTUBE250	MH6
	500 MCM	RT75CM5CMJ	US400	(2) NUWTUBE200	MH7
	750 MCM	RT75CM75CMJ	US500	(2) NUWTUBE250	MH7
1000 MCM	1/0	RT1MM1/0I	US150	NUWTUBE150	MH6
	2/0	RT1MM2/0I	US150	NUWTUBE150	MH6
	3/0	RT1MM3/0I	US200	NUWTUBE200	MH6
	4/0	RT1MM4/0I	US200	NUWTUBE200	MH6
	250 MCM	RT1MM25CMI	US200	NUWTUBE200	MH6
	300 MCM	RT1MM3CMI	US200	NUWTUBE200	MH6
	350 MCM	RT1MM35CMI	US250	NUWTUBE250	MH6
	500 MCM	RT1MM5CMJ	US400	(2) NUWTUBE200	MH7
	750 MCM	RT1MM75CMJ	US500	(2) NUWTUBE250	MH7
	1000 MCM	RT1MM1MMJ	US500	(2) NUWTUBE250	MH7

Cable to Cable

Mold Information:
- Cross of Horizontal Cables, Lapped & Not Cut
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

Horizontal Split 2-Piece Design

XO



c UL us Listed 467
#6 through 250 MCM

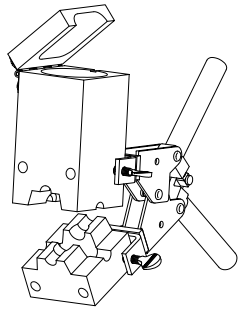
XO 4/0 2/0 Q

- XO — Style
- 4/0 — Cable Size Run
- 2/0 — Cable Size Tap
- Q — Price Key

XO Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
#6	#6	XO66B	US45	NUWTUBE45	MH1
#4	#4	XO44B	US65	NUWTUBE65	MH1
#2 Sol	#2 Sol	XO2S2SB	US90	NUWTUBE90	MH1
#2	#4 #2	XO24B XO22B	US65 US90	NUWTUBE65 NUWTUBE90	MH1
1/0	#4 #2 1/0	XO1/04Q XO1/02Q XO1/01/0Q	US115 US115 US150	NUWTUBE115 NUWTUBE115 NUWTUBE150	MH1
2/0	#2 1/0 2/0	XO2/02Q XO2/01/0Q XO2/02/0Q	US150 US200 US200	NUWTUBE150 NUWTUBE200 NUWTUBE200	MH1
3/0	#2 1/0 2/0 3/0	XO3/02Q XO3/01/0Q XO3/02/0Q XO3/03/0Q	US150 US200 US200 US250	NUWTUBE150 NUWTUBE200 NUWTUBE200 NUWTUBE250	MH1
4/0	#2 1/0 2/0 3/0 4/0	XO4/02Q XO4/01/0Q XO4/02/0Q XO4/03/0Q XO4/04/0Q	US150 US200 US200 US250 US250	NUWTUBE150 NUWTUBE200 NUWTUBE200 NUWTUBE250 NUWTUBE250	MH1

Horizontal Split 2-Piece Design



Recommended Accessories:

MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

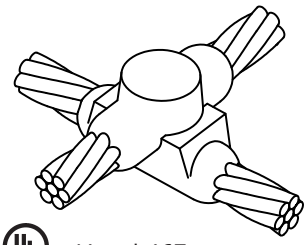
XO Instructions

Cable to Cable

Vertical & Horizontal Split 3-Piece Design

Mold Information:
- Cross of Horizontal Cables, Lapped & Not Cut
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

XO



c UL us Listed 467
#6 through 250 MCM

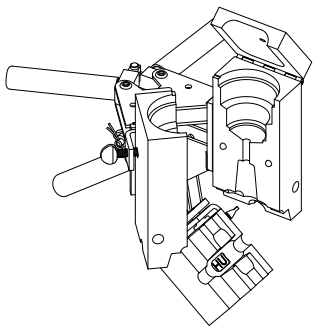
XO 4/0 2/0 I

- XO — Style
- 4/0 — Cable Size Run
- 2/0 — Cable Size Tap
- I — Price Key

XO Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
4/0	#2	XO4/02I	US150	NUWTUBE150	MH6
	1/0	XO4/01/0I	US200	NUWTUBE200	
	2/0	XO4/02/0I	US200	NUWTUBE200	
	3/0	XO4/03/0I	US250	NUWTUBE250	
	4/0	XO4/04/0I	US250	NUWTUBE250	
250 MCM	#2	XO25CM2I	US150	NUWTUBE150	MH6
	1/0	XO25CM1/0I	US250	NUWTUBE250	
	2/0	XO25CM2/0I	US250	NUWTUBE250	
	3/0	XO25CM3/0I	US300	(2) NUWTUBE150	
	4/0	XO25CM4/0I	US300	(2) NUWTUBE150	
	250 MCM	XO25CM25CMI	US300	(2) NUWTUBE150	
500 MCM	#2	XO5CM2I	US250	NUWTUBE250	MH6
	1/0	XO5CM1/0I	US300	(2) NUWTUBE150	MH6
	2/0	XO5CM2/0J	US400	(2) NUWTUBE200	MH7
	3/0	XO5CM3/0J	US500	(2) NUWTUBE250	MH7
	4/0	XO5CM4/0J	US500	(2) NUWTUBE250	MH7
	250 MCM	XO5CM25CMJ	US500	(2) NUWTUBE250	MH7
	300 MCM	XO5CM3CMJ	US600	(3) NUWTUBE200	MH7
	350 MCM	XO5CM35CMJ	US600	(3) NUWTUBE200	MH7
	500 MCM	XO5CM5CMJ	US750	(3) NUWTUBE250	MH7

Vertical & Horizontal Split 3-Piece Design



Recommended Accessories:

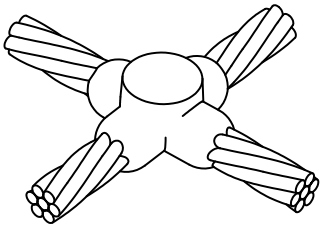
MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

XO Instructions

Cable to Cable

Mold Information:
- Cross of Horizontal Cables, Tap Cable Cut, Cables in Same Plane
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

XX



c UL us Listed 467
#6 through 250 MCM

XX 4/0 2/0 B

- XX — Style
- 4/0 — Cable Size Run
- 2/0 — Cable Size Tap
- B — Price Key

XX Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
#6	#6	XX66B	US32	NUWTUBE32	MH1
#4	#4	XX44B	US45	NUWTUBE45	MH1
#2 Sol	#2 Sol	XX2S2SB	US65	NUWTUBE65	MH1
#2	#4 #2	XX24B XX22B	US65 US65	NUWTUBE65 NUWTUBE65	MH1
1/0	#4 #2 1/0	XX1/04B XX1/02B XX1/01/0B	US90 US90 US90	NUWTUBE90 NUWTUBE90 NUWTUBE90	MH1
2/0	#2 1/0 2/0	XX2/02B XX2/01/0B XX2/02/0B	US115 US115 US115	NUWTUBE115 NUWTUBE115 NUWTUBE115	MH1
3/0	#2 1/0 2/0 3/0	XX3/02B XX3/01/0B XX3/02/0B XX3/03/0B	US115 US115 US150 US150	NUWTUBE115 NUWTUBE115 NUWTUBE150 NUWTUBE150	MH1
4/0	#2 1/0 2/0 3/0 4/0	XX4/02B XX4/01/0B XX4/02/0B XX4/03/0B XX4/04/0B	US115 US150 US150 US200 US200	NUWTUBE115 NUWTUBE150 NUWTUBE150 NUWTUBE200 NUWTUBE200	MH1
250 MCM	#2 1/0 2/0 3/0 4/0 250 MCM	XX25CM2B XX25CM1/0B XX25CM2/0B XX25CM3/0B XX25CM4/0B XX25CM25CMB	US115 US150 US150 US200 US200 US200	NUWTUBE115 NUWTUBE150 NUWTUBE150 NUWTUBE200 NUWTUBE200 NUWTUBE200	MH1
500 MCM	#2 1/0 2/0 3/0 4/0 250 MCM 300 MCM 350 MCM 500 MCM	XX5CM2B XX5CM1/0B XX5CM2/0B XX5CM3/0C XX5CM4/0C XX5CM25CMC XX5CM3CMC XX5CM35CMC XX5CM5CMC	US200 US250 US250 US300 US300 US300 US400 US400 US500	NUWTUBE200 NUWTUBE250 NUWTUBE250 (2) NUWTUBE150 (2) NUWTUBE150 (2) NUWTUBE150 (2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE250	MH1 MH1 MH1 MH2 MH2 MH2 MH2 MH2 MH2

Recommended Accessories:

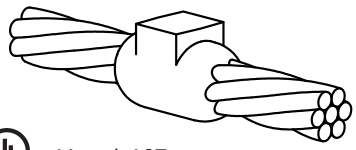
MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

XX Instructions

Cable to Cable

Mold Information:
- Butt End Splice of Horizontal Cables
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

BS



c UL us Listed 467
#6 through 250 MCM

BS Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6 Sol	BS6SL	US25	NUWTUBE25	Included
#4	BS4L	US25	NUWTUBE25	Included
#2 Sol	BS2SL	US32	NUWTUBE32	Included
#2	BS2L	US32	NUWTUBE32	Included
1/0	BS1/0B	US45	NUWTUBE45	MH1
2/0	BS2/0B	US65	NUWTUBE65	MH1
3/0	BS3/0B	US90	NUWTUBE90	MH1
4/0	BS4/0B	US90	NUWTUBE90	MH1
250 MCM	BS25CMB	US115	NUWTUBE115	MH1
300 MCM	BS3CMB	US115	NUWTUBE115	MH1
350 MCM	BS35CMB	US150	NUWTUBE150	MH1
500 MCM	BS5CMB	US200	NUWTUBE200	MH1
750 MCM	BS75CMC	US300	(2) NUWTUBE150	MH2
1000 MCM	BS1MMC	US400	(2) NUWTUBE200	MH2

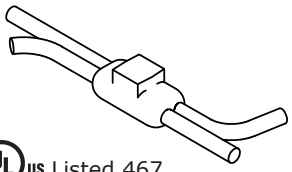
Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

BS Instructions

BS 4/0 B
- BS — Style
- 4/0 — Cable Size Run
- B — Price Key

Mold Information:
- Parallel Through Splice of Horizontal Cables
- Molds listed are for solid or concentric stranded copper conductors.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

PS



c UL us Listed 467
#6 through #2

PS Connection

Cable Size		Mold Part No.	Weld Metal		Required Handle
Run	Tap		UltraShot	NuwTube	
#8 Sol	#8 Sol	PS8S8SL	US25	NUWTUBE25	
#8	#8	PS88L	US25	NUWTUBE25	
#6 Sol	#6 Sol	PS6S6SL	US25	NUWTUBE25	
#6	#6	PS66L	US25	NUWTUBE25	Included
#4 Sol	#4 Sol	PS4S4SM	US32	NUWTUBE32	
#4	#4	PS44M	US32	NUWTUBE32	
#2 Sol	#2 Sol	PS2S2SM	US45	NUWTUBE45	

PS 6S 6S L
- PS — Style
- 6S — Cable Size Run
- 6S — Cable Size Tap
- L — Price Key

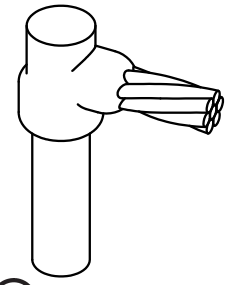
Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

PS Instructions

Cable to Ground Rod

Mold Information:
- Single Cable Dead Ended to Top of Ground Rod
- Molds shown are for unthreaded copper-bonded steel ground rods. For sectional ground rods, add letter "S" to ground rod size.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

GD



c UL us Listed 467
#6 through 250 MCM

GD 58 2/0 B

- GD — Style
- 58 — Ground Rod Size
- 2/0 — Cable Size
- B — Price Key

GD Connection

Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/2"	#6	GD12F6L	US25	NUWTUBE25	Included
	#4	GD12F4L	US25	NUWTUBE25	Included
	#2 Sol	GD12F2SB	US65	NUWTUBE65	MH1
	#2	GD12F2B	US65	NUWTUBE65	MH1
	1/0	GD12F1/0B	US90	NUWTUBE90	MH1
	2/0	GD12F2/0B	US90	NUWTUBE90	MH1
	3/0	GD12F3/0B	US90	NUWTUBE90	MH1
	4/0	GD12F4/0B	US90	NUWTUBE90	MH1
5/8"	#6	GD586L	US32	NUWTUBE32	Included
	#4	GD584L	US32	NUWTUBE32	Included
	#2 Sol	GD582SB	US65	NUWTUBE65	MH1
	#2	GD582B	US65	NUWTUBE65	MH1
	1/0	GD581/0B	US90	NUWTUBE90	MH1
	2/0	GD582/0B	US90	NUWTUBE90	MH1
	3/0	GD583/0B	US90	NUWTUBE90	MH1
	4/0	GD584/0B	US90	NUWTUBE90	MH1
	250 MCM	GD5825CMB	US115	NUWTUBE115	MH1
	300 MCM	GD583CMB	US115	NUWTUBE115	MH1
	350 MCM	GD5835CMB	US115	NUWTUBE115	MH1
	500 MCM	GD585CMB	US150	NUWTUBE150	MH1
3/4"	#6	GD346L	US32	NUWTUBE32	Included
	#4	GD344L	US45	NUWTUBE45	Included
	#2 Sol	GD342SB	US90	NUWTUBE90	MH1
	#2	GD342B	US90	NUWTUBE90	MH1
	1/0	GD341/0B	US90	NUWTUBE90	MH1
	2/0	GD342/0B	US90	NUWTUBE90	MH1
	3/0	GD343/0B	US90	NUWTUBE90	MH1
	4/0	GD344/0B	US90	NUWTUBE90	MH1
	250 MCM	GD3425CMB	US90	NUWTUBE90	MH1
	300 MCM	GD343CMB	US115	NUWTUBE115	MH1
	350 MCM	GD3435CMB	US115	NUWTUBE115	MH1
	500 MCM	GD345CMB	US150	NUWTUBE150	MH1
1"	#6	GD106B	US90	NUWTUBE90	MH1
	#4	GD104B	US90	NUWTUBE90	
	#2 Sol	GD102SB	US150	NUWTUBE150	
	#2	GD102B	US150	NUWTUBE150	
	1/0	GD101/0B	US150	NUWTUBE150	
	2/0	GD102/0B	US150	NUWTUBE150	
	3/0	GD103/0B	US150	NUWTUBE150	
	4/0	GD104/0B	US150	NUWTUBE150	
	250 MCM	GD1025CMB	US150	NUWTUBE150	
	300 MCM	GD103CMB	US200	NUWTUBE200	
	350 MCM	GD1035CMB	US200	NUWTUBE200	
	500 MCM	GD105CMB	US200	NUWTUBE200	

Recommended Accessories:

VG10 - Locking Pliers
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

GD Instructions

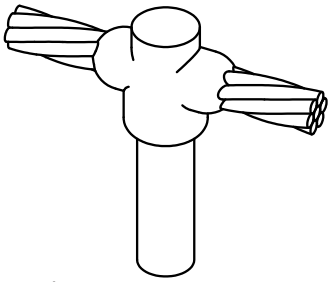
NOTES:

- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.
- Technical information for ground rod sizes and mold codes on page 267.

Cable to Ground Rod

Mold Information:
- Horizontal Through Cable to Top of Ground Rod
- Molds shown are for unthreaded copper-bonded steel ground rods. For sectional ground rods, add letter "S" to ground rod size.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

GO



c UL us Listed 467
#6 through 250 MCM

GO 34 3/0 B

- GO — Style
- 34 — Ground Rod Size
- 3/0 — Cable Size
- B — Price Key

GO Connection

Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/2"	#6	GO12F6L	US32	NUWTUBE32	Included
	#4	GO12F4L	US32	NUWTUBE32	Included
	#2 Sol	GO12F2SB	US90	NUWTUBE90	MH1
	#2	GO12F2B	US90	NUWTUBE90	MH1
	1/0	GO12F1/0B	US90	NUWTUBE90	MH1
	2/0	GO12F2/0B	US90	NUWTUBE90	MH1
	3/0	GO12F3/0B	US115	NUWTUBE115	MH1
	4/0	GO12F4/0B	US115	NUWTUBE115	MH1
5/8"	#6	GO586L	US32	NUWTUBE32	Included
	#4	GO584L	US32	NUWTUBE32	Included
	#2 Sol	GO582SB	US90	NUWTUBE90	MH1
	#2	GO582B	US90	NUWTUBE90	MH1
	1/0	GO581/0B	US90	NUWTUBE90	MH1
	2/0	GO582/0B	US115	NUWTUBE115	MH1
	3/0	GO583/0B	US115	NUWTUBE115	MH1
	4/0	GO584/0B	US115	NUWTUBE115	MH1
	250 MCM	GO5825CMB	US150	NUWTUBE150	MH1
	300 MCM	GO583CMB	US200	NUWTUBE200	MH1
	350 MCM	GO5835CMB	US200	NUWTUBE200	MH1
	500 MCM	GO585CMB	US250	NUWTUBE250	MH1
	750 MCM	GO5875CMC	US400	(2) NUWTUBE200	MH2
	1000 MCM	GO581MMC	US400	(2) NUWTUBE200	MH2
3/4"	#6	GO346L	US45	NUWTUBE45	Included
	#4	GO344M	US65	NUWTUBE65	Included
	#2 Sol	GO342SB	US90	NUWTUBE90	MH1
	#2	GO342B	US90	NUWTUBE90	MH1
	1/0	GO341/0B	US115	NUWTUBE115	MH1
	2/0	GO342/0B	US115	NUWTUBE115	MH1
	3/0	GO343/0B	US115	NUWTUBE115	MH1
	4/0	GO344/0B	US115	NUWTUBE115	MH1
	250 MCM	GO3425CMB	US150	NUWTUBE150	MH1
	300 MCM	GO343CMB	US200	NUWTUBE200	MH1
	350 MCM	GO3435CMB	US200	NUWTUBE200	MH1
	500 MCM	GO345CMB	US250	NUWTUBE250	MH1
	750 MCM	GO3475CMC	US400	(2) NUWTUBE200	MH2
	1000 MCM	GO341MMC	US500	(2) NUWTUBE250	MH2
1"	#6	GO106B	US150	NUWTUBE150	MH1
	#4	GO104B	US150	NUWTUBE150	MH1
	#2 Sol	GO102SB	US150	NUWTUBE150	MH1
	#2	GO102B	US150	NUWTUBE150	MH1
	1/0	GO101/0B	US150	NUWTUBE150	MH1
	2/0	GO102/0B	US150	NUWTUBE150	MH1
	3/0	GO103/0B	US150	NUWTUBE150	MH1
	4/0	GO104/0B	US150	NUWTUBE150	MH1
	250 MCM	GO1025CMB	US200	NUWTUBE200	MH1
	300 MCM	GO103CMB	US200	NUWTUBE200	MH1
	350 MCM	GO1035CMB	US200	NUWTUBE200	MH1
	500 MCM	GO105CMB	US250	NUWTUBE250	MH1
	750 MCM	GO1075CMC	US400	(2) NUWTUBE200	MH2
	1000 MCM	GO101MMC	US500	(2) NUWTUBE250	MH2

Recommended Accessories:

VG10 - Locking Pliers
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

GO Instructions

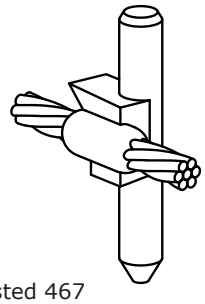
NOTES:

- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.
- Technical information for ground rod sizes and mold codes on page 267.

Cable to Ground Rod

Mold Information:
- Horizontal Through Cable to Side of Ground Rod
- Molds shown are for unthreaded copper-bonded steel ground rods. For sectional ground rods, add letter "S" to ground rod size.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

GS

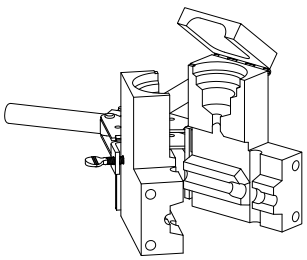


c UL us Listed 467
#6 through 250 MCM

GS 34 4/0 P

- GS — Style
- 34 — Ground Rod Size
- 4/0 — Cable Size
- P — Price Key

2-Piece Design



GS Connection

Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/2"	#6	GS12F6R	US65	NUWTUBE65	MH3
	#4	GS12F4R	US65	NUWTUBE65	MH3
	#2 Sol	GS12F2SR	US65	NUWTUBE65	MH3
	#2	GS12F2R	US65	NUWTUBE65	MH3
	1/0	GS12F1/0P	US115	NUWTUBE115	MH1
	2/0	GS12F2/0P	US115	NUWTUBE115	MH1
	3/0	GS12F3/0P	US150	NUWTUBE150	MH1
	4/0	GS12F4/0P	US150	NUWTUBE150	MH1
5/8"	#6	GS586R	US65	NUWTUBE65	MH3
	#4	GS584R	US65	NUWTUBE65	MH3
	#2 Sol	GS582SR	US65	NUWTUBE65	MH3
	#2	GS582R	US65	NUWTUBE65	MH3
	1/0	GS581/0P	US115	NUWTUBE115	MH1
	2/0	GS582/0P	US115	NUWTUBE115	MH1
	3/0	GS583/0P	US150	NUWTUBE150	MH1
	4/0	GS584/0P	US150	NUWTUBE150	MH1
	250 MCM	GS5825CMP	US150	NUWTUBE150	MH1
	300 MCM	GS583CMP	US200	NUWTUBE200	MH1
	350 MCM	GS5835CMP	US250	NUWTUBE200	MH1
	500 MCM	GS585CMY	US400	(2) NUWTUBE200	MH2
3/4"	#6	GS346R	US65	NUWTUBE65	MH3
	#4	GS344R	US65	NUWTUBE65	MH3
	#2 Sol	GS342SR	US65	NUWTUBE65	MH3
	#2	GS342R	US65	NUWTUBE65	MH3
	1/0	GS341/0P	US115	NUWTUBE115	MH1
	2/0	GS342/0P	US115	NUWTUBE115	MH1
	3/0	GS343/0P	US150	NUWTUBE150	MH1
	4/0	GS344/0P	US150	NUWTUBE150	MH1
	250 MCM	GS3425CMP	US200	NUWTUBE200	MH1
	300 MCM	GS343CMP	US250	NUWTUBE250	MH1
	350 MCM	GS3435CMY	US300	(2) NUWTUBE150	MH2
	500 MCM	GS345CMY	US500	(2) NUWTUBE250	MH2
1"	#6	GS106P	US90	NUWTUBE90	MH1
	#4	GS104P	US90	NUWTUBE90	MH1
	#2 Sol	GS102SP	US90	NUWTUBE90	MH1
	#2	GS102P	US90	NUWTUBE90	MH1
	1/0	GS101/0P	US115	NUWTUBE115	MH1
	2/0	GS102/0P	US115	NUWTUBE115	MH1
	3/0	GS103/0P	US150	NUWTUBE150	MH1
	4/0	GS104/0P	US150	NUWTUBE150	MH1
	250 MCM	GS1025CMP	US200	NUWTUBE200	MH1
	300 MCM	GS103CMP	US250	NUWTUBE250	MH1
	350 MCM	GS1035CMY	US300	(2) NUWTUBE150	MH2
	500 MCM	GS105CMY	US500	(2) NUWTUBE250	MH2

Recommended Accessories:

VG10 - Locking Pliers
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

GS Instructions

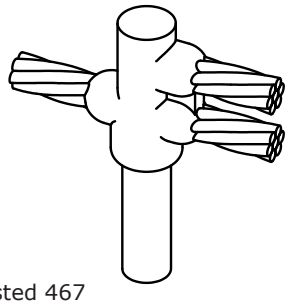
NOTES:

- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.
- Technical information for ground rod sizes and mold codes on page 267.

Cable to Ground Rod

Mold Information:
- Horizontal Through Cable Plus Tap Cable to Top of Ground Rod
- Molds shown are for unthreaded copper-bonded steel ground rods. For sectional ground rods, add letter "S" to ground rod size.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

GT



c UL us Listed 467
#6 through 250 MCM

GT 34 2/0 K

- GT — Style
- 34 — Ground Rod Size
- 2/0 — Cable Size
- K — Price Key

GT Connection

Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/2"	#6	GT12F6K	US90	NUWTUBE90	MH1
	#4	GT12F4K	US90	NUWTUBE90	
	#2 Sol	GT12F2SK	US90	NUWTUBE90	
	#2	GT12F2K	US90	NUWTUBE90	
	1/0	GT12F1/0K	US115	NUWTUBE115	
	2/0	GT12F2/0K	US150	NUWTUBE150	
	3/0	GT12F3/0K	US200	NUWTUBE200	
	4/0	GT12F4/0K	US200	NUWTUBE200	
5/8"	#6	GT586K	US90	NUWTUBE90	MH1
	#4	GT584K	US90	NUWTUBE90	MH1
	#2 Sol	GT582SK	US115	NUWTUBE115	MH1
	#2	GT582K	US115	NUWTUBE115	MH1
	1/0	GT581/0K	US150	NUWTUBE150	MH1
	2/0	GT582/0K	US200	NUWTUBE200	MH1
	3/0	GT583/0K	US250	NUWTUBE250	MH1
	4/0	GT584/0K	US250	NUWTUBE250	MH1
	250 MCM	GT5825CMK	US300	(2) NUWTUBE150	MH1
	300 MCM	GT583CMD	US400	(2) NUWTUBE200	MH2
	350 MCM	GT5835CMD	US400	(2) NUWTUBE200	MH2
	500 MCM	GT585CMD	US600	(3) NUWTUBE200	MH2
3/4"	#6	GT346K	US90	NUWTUBE90	MH1
	#4	GT344K	US90	NUWTUBE90	MH1
	#2 Sol	GT342SK	US115	NUWTUBE115	MH1
	#2	GT342K	US115	NUWTUBE115	MH1
	1/0	GT341/0K	US150	NUWTUBE150	MH1
	2/0	GT342/0K	US200	NUWTUBE200	MH1
	3/0	GT343/0K	US250	NUWTUBE250	MH1
	4/0	GT344/0K	US250	NUWTUBE250	MH1
	250 MCM	GT3425CMK	US300	(2) NUWTUBE150	MH1
	300 MCM	GT343CMD	US400	(2) NUWTUBE200	MH2
	350 MCM	GT3435CMD	US400	(2) NUWTUBE200	MH2
	500 MCM	GT345CMD	US600	(3) NUWTUBE200	MH2
1"	#6	GT106K	US150	NUWTUBE150	MH1
	#4	GT104K	US150	NUWTUBE150	MH1
	#2 Sol	GT102SK	US150	NUWTUBE150	MH1
	#2	GT102K	US150	NUWTUBE150	MH1
	1/0	GT101/0K	US200	NUWTUBE200	MH1
	2/0	GT102/0K	US250	NUWTUBE250	MH1
	3/0	GT103/0K	US300	(2) NUWTUBE150	MH1
	4/0	GT104/0K	US300	(2) NUWTUBE150	MH1
	250 MCM	GT1025CMD	US400	(2) NUWTUBE200	MH2
	300 MCM	GT103CMD	US500	(2) NUWTUBE250	MH2
	350 MCM	GT1035CMD	US500	(2) NUWTUBE250	MH2
	500 MCM	GT105CMD	US750	(3) NUWTUBE250	MH2

Recommended Accessories:

VG10 - Locking Pliers
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

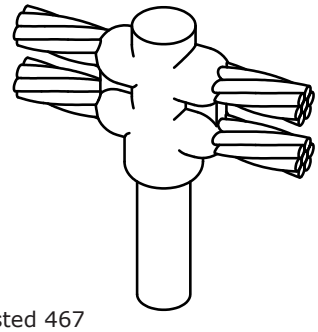
GT Instructions

NOTES:
- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.
- Technical information for ground rod sizes and mold codes on page 267.

Cable to Ground Rod

Mold Information:
- Parallel Through Horizontal Cables (Tap over Run) to Top of Ground Rod
- Molds shown are for unthreaded copper-bonded steel ground rods. For sectional ground rods, add letter "S" to ground rod size.
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

GF



c UL us Listed 467
#6 through 250 MCM

GF 34 3/0 K

- GF — Style
- 34 — Ground Rod Size
- 3/0 — Cable Size
- K — Price Key

GF Connection

Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/2"	#6	GF12F6K	US90	NUWTUBE90	MH1
	#4	GF12F4K	US115	NUWTUBE115	
	#2 Sol	GF12F2SK	US115	NUWTUBE115	
	#2	GF12F2K	US115	NUWTUBE115	
	1/0	GF12F1/0K	US150	NUWTUBE150	
	2/0	GF12F2/0K	US200	NUWTUBE200	
	3/0	GF12F3/0K	US250	NUWTUBE250	
	4/0	GF12F4/0K	US250	NUWTUBE250	
5/8"	#6	GF586K	US90	NUWTUBE90	MH1
	#4	GF584K	US115	NUWTUBE115	MH1
	#2 Sol	GF582SK	US150	NUWTUBE150	MH1
	#2	GF582K	US150	NUWTUBE150	MH1
	1/0	GF581/0K	US200	NUWTUBE200	MH1
	2/0	GF582/0K	US250	NUWTUBE250	MH1
	3/0	GF583/0K	US300	(2) NUWTUBE150	MH1
	4/0	GF584/0K	US300	(2) NUWTUBE150	MH1
	250 MCM	GF5825CMD	US400	(2) NUWTUBE200	MH2
	300 MCM	GF583CMD	US500	(2) NUWTUBE250	MH2
	350 MCM	GF5835CMD	US500	(2) NUWTUBE250	MH2
	500 MCM	GF585CMD	US750	(3) NUWTUBE250	MH2
3/4"	#6	GF346K	US90	NUWTUBE90	MH1
	#4	GF344K	US115	NUWTUBE115	MH1
	#2 Sol	GF342SK	US150	NUWTUBE150	MH1
	#2	GF342K	US150	NUWTUBE150	MH1
	1/0	GF341/0K	US200	NUWTUBE200	MH1
	2/0	GF342/0K	US250	NUWTUBE250	MH1
	3/0	GF343/0K	US300	(2) NUWTUBE150	MH1
	4/0	GF344/0K	US300	(2) NUWTUBE150	MH1
	250 MCM	GF3425CMD	US400	(2) NUWTUBE200	MH2
	300 MCM	GF343CMD	US500	(2) NUWTUBE250	MH2
	350 MCM	GF3435CMD	US500	(2) NUWTUBE250	MH2
	500 MCM	GF345CMD	US750	(3) NUWTUBE250	MH2
1"	#6	GF106K	US150	NUWTUBE150	MH1
	#4	GF104K	US150	NUWTUBE150	MH1
	#2 Sol	GF12SK	US150	NUWTUBE150	MH1
	#2	GF102K	US200	NUWTUBE200	MH1
	1/0	GF101/0K	US250	NUWTUBE250	MH1
	2/0	GF102/0K	US300	(2) NUWTUBE150	MH1
	3/0	GF103/0D	US400	(2) NUWTUBE200	MH2
	4/0	GF104/0D	US400	(2) NUWTUBE200	MH2
	250 MCM	GF1025CMD	US500	(2) NUWTUBE250	MH2
	300 MCM	GF103CMD	US600	(3) NUWTUBE200	MH2
	350 MCM	GF1035CMD	US600	(3) NUWTUBE200	MH2
	500 MCM	GF105CMD	US1000	(4) NUWTUBE250	MH2

Recommended Accessories:
VG10 - Locking Pliers
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

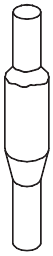
GF Instructions

NOTES:
- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.
- Technical information for ground rod sizes and mold codes on page 267.

Ground Rod to Ground Rod

Mold Information:
- Butt Splice of Vertical Ground Rods
- Molds shown are for unthreaded copper-bonded steel ground rods.

GG



GG Connection

Ground Rod Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
1/2"	GG12FB	US250	NUWTUBE250	MH1
5/8"	GG58C	US300	(2) NUWTUBE150	MH2
3/4"	GG34C	US400	(2) NUWTUBE200	MH2

GG 34 C
- GG — Style
- 34 — Ground Rod Size
- C — Price Key

Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

GG Instructions

NOTES:
- 1/2" molds are suitable for copper-bonded and full size ground rods.
- For welding to stainless steel, galvanized steel or solid copper ground rods, add letter "F" to ground rod size.

Ground Rod Technical Information

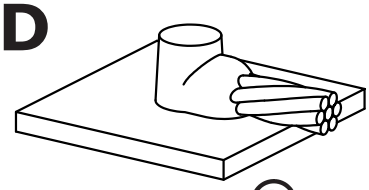
Nominal Size	Material	Type	Body Diameter	Thread Size	Ground Rod Code
1/2"	Copper-Bonded	Sectional	.504"	9/16"	12S
	Copper-Bonded	Plain	.504"	N/A	12F
	Steel*	Plain	.504"	N/A	12F
	Copper-Bonded	Plain	.475"	N/A	12
5/8"	Steel*	Plain	.625"	N/A	58F
	Copper-Bonded	Plain	.56"	N/A	58
	Copper-Bonded	Sectional	.56"	5/8"	58S
3/4"	Steel*	Plain	.75"	N/A	34F
	Copper-Bonded	Plain	.678"	N/A	34
	Copper-Bonded	Sectional	.678"	3/4"	34S
1"	Steel*	Plain	1.00"	N/A	10F
	Copper-Bonded	Plain	.912"	N/A	10
	Copper-Bonded	Sectional	.912"	1"	10S

* Stainless steel, galvanized steel, solid copper

Cable to Steel Surface / Pipe

Mold Information:
- Horizontal Cable to Horizontal Flat Steel Surface, ON Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

HD



c UL us Listed 467
#6 through 250 MCM

HD Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	HD6A	US45	NUWTUBE45	Included
#4	HD4A	US45	NUWTUBE45	Included
#2 Sol	HD2SA	US45	NUWTUBE45	Included
#2	HD2A	US45	NUWTUBE45	Included
1/0	HD1/0B	US90	NUWTUBE90	MH1
2/0	HD2/0B	US90	NUWTUBE90	MH1
3/0	HD3/0B	US115	NUWTUBE115	MH1
4/0	HD4/0B	US115	NUWTUBE115	MH1

Recommended Accessories:

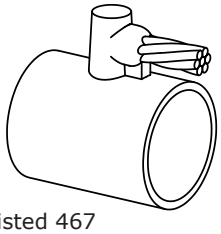
UMMHDA - Hold Down Kit for price key "A" molds
UMHDKIT - Hold Down Kit for price key "B" molds
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "A" molds

HD Instructions

HD 2S A
- HD: Style
- 2S: Cable Size
- A: Price Key

Mold Information:
- Horizontal Cable to Top of Horizontal Steel Pipe, ON Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

HD



c UL us Listed 467
#6 through 250 MCM

HD Connection to Pipe

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	HD6*A	US45	NUWTUBE45	-
#4	HD4*A	US45	NUWTUBE45	-
#2 Sol	HD2S*A	US45	NUWTUBE45	-
#2	HD2*A	US45	NUWTUBE45	-
1/0	HD1/0*B	US90	NUWTUBE90	MH1
2/0	HD2/0*B	US90	NUWTUBE90	MH1
3/0	HD3/0*B	US115	NUWTUBE115	MH1
4/0	HD4/0*B	US115	NUWTUBE115	MH1

- For conductor sizes smaller than 1/0 in an HD connection use:
  - Flat steel molds for nominal pipe sizes larger than 12"
  - Molds with pipe size designations for nominal pipe sizes 12" and smaller
- For conductor sizes 1/0 and larger in an HD connection use:
  - Flat steel molds for nominal pipe sizes larger than 28"
  - Molds with pipe size designations for nominal pipe sizes 28" and smaller

Recommended Accessories:

UMMHDA - Hold Down Kit for price key "A" molds
UMHDKIT - Hold Down Kit for price key "B" molds
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "A" molds

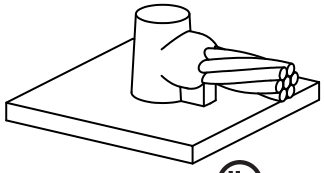
HD to Pipe Instructions

HD 4/0 * B
- HD: Style
- 4/0: Cable Size
- *: Nominal Pipe Size
- B: Price Key

Cable to Steel Surface / Pipe

Mold Information:
- Horizontal Cable to Horizontal Flat Steel Surface, OFF Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

HB



c UL us Listed 467
#6 through 250 MCM

HB Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	HB6B	US65	NUWTUBE65	MH1
#4	HB4B	US65	NUWTUBE65	MH1
#2 Sol	HB2SB	US65	NUWTUBE65	MH1
#2	HB2B	US65	NUWTUBE65	MH1
1/0	HB1/0B	US90	NUWTUBE90	MH1
2/0	HB2/0B	US90	NUWTUBE90	MH1
3/0	HB3/0B	US115	NUWTUBE115	MH1
4/0	HB4/0B	US115	NUWTUBE115	MH1
250 MCM	HB25CMB	US115	NUWTUBE115	MH1
300 MCM	HB3CMB	US150	NUWTUBE150	MH1
350 MCM	HB35CMB	US200	NUWTUBE200	MH1
500 MCM	HB5CMC	US200	NUWTUBE200	MH2
750 MCM	HB75CMC	US300	2-NUWTUBE150	MH2
1000 MCM	HB1MMC	US400	2-NUWTUBE200	MH2

Recommended Accessories:

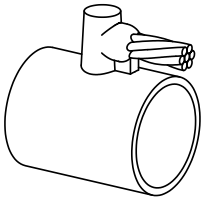
UMHDKIT - Hold Down Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

HB Instructions

HB 1/0 B
- HB: Style
- 1/0: Cable Size
- B: Price Key

Mold Information:
- Horizontal Cable to Top of Horizontal Steel Pipe, OFF Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

HB



c UL us Listed 467
#6 through 250 MCM

HB Connection to Pipe

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
1/0	HB1/0*B	US90	NUWTUBE90	MH1
2/0	HB2/0*B	US90	NUWTUBE90	
3/0	HB3/0*B	US115	NUWTUBE115	
4/0	HB4/0*B	US115	NUWTUBE115	
250 MCM	HB25CM*B	US115	NUWTUBE115	

- For conductor sizes smaller than 1/0 in an HB connection use:
  - Flat steel molds for nominal pipe sizes larger than 12"
  - Molds with pipe size designations for nominal pipe sizes 12" and smaller
- For conductor sizes 1/0 and larger in an HB connection use:
  - Flat steel molds for nominal pipe sizes larger than 28"
  - Molds with pipe size designations for nominal pipe sizes 28" and smaller

Recommended Accessories:

UMHDKIT - Hold Down Kit
CSKITHP - Chain Support Kit for Horizontal Pipe
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

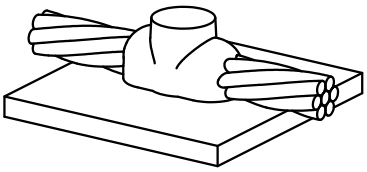
HB to Pipe Instructions

HB 1/0 * B
- HB: Style
- 1/0: Cable Size
- *: Nominal Pipe Size
- B: Price Key

Cable to Steel Surface

Mold Information:
- Horizontal Cable to Horizontal Flat Steel Surface, ON Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

HT



c UL us Listed 467
#6 through 250 MCM

HT Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	HT6A	US45	NUWTUBE45	Included
#4	HT4A	US45	NUWTUBE45	Included
#2 Sol	HT2SA	US45	NUWTUBE45	Included
#2	HT2A	US45	NUWTUBE45	Included
1/0	HT1/0B	US90	NUWTUBE90	MH1
2/0	HT2/0B	US115	NUWTUBE115	MH1
3/0	HT3/0B	US115	NUWTUBE115	MH1
4/0	HT4/0B	US150	NUWTUBE150	MH1

Recommended Accessories:

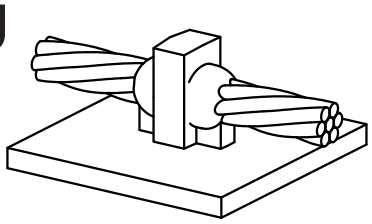
UMMHDA - Hold Down Kit for price key "A" molds
UMHDKIT - Hold Down Kit for price key "B" molds
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "A" molds

HT Instructions

HT 2 A
HT = Style, 2 = Cable Size, A = Price Key

Mold Information:
- Horizontal Through Cable to Horizontal Flat Steel Surface, OFF Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

HU



c UL us Listed 467
#6 through 250 MCM

HU Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
1/0	HU1/0B	US90	NUWTUBE90	MH1
2/0	HU2/0B	US115	NUWTUBE115	MH1
3/0	HU3/0B	US115	NUWTUBE115	MH1
4/0	HU4/0B	US150	NUWTUBE150	MH1
250 MCM	HU25CMB	US150	NUWTUBE150	MH1
300 MCM	HU3CMB	US200	NUWTUBE200	MH1
350 MCM	HU35CMB	US250	NUWTUBE250	MH1
500 MCM	HU5CMC	US300	(2) NUWTUBE150	MH2

Recommended Accessories:

UMHDKIT - Hold Down Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

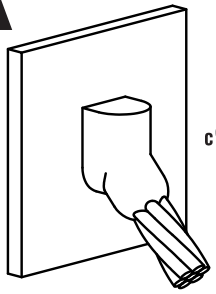
HU Instructions

HU 4/0 B
HU = Style, 4/0 = Cable Size, B = Price Key

Cable to Steel Surface

Mold Information:
- Cable Down at 45° to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VA



c UL us Listed 467
#6 through 250 MCM

Recommended Accessories:

MSKIT - Magnetic Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VA Instructions

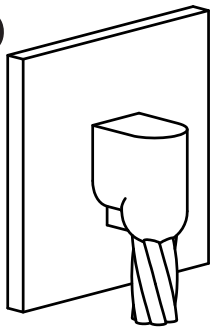
VA Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VA6B	US45	NUWTUBE45	MH1
#4	VA4B	US45	NUWTUBE45	MH1
#2 Sol	VA2SB	US45	NUWTUBE45	MH1
#2	VA2B	US45	NUWTUBE45	MH1
1/0	VA1/0B	US90	NUWTUBE90	MH1
2/0	VA2/0B	US90	NUWTUBE90	MH1
3/0	VA3/0B	US115	NUWTUBE115	MH1
4/0	VA4/0B	US115	NUWTUBE115	MH1
250 MCM	VA25CMB	US115	NUWTUBE115	MH1
300 MCM	VA3CMB	US150	NUWTUBE150	MH1
350 MCM	VA35CMB	US200	NUWTUBE200	MH1
500 MCM	VA5CMB	US200	NUWTUBE200	MH1
750 MCM	VA75CMC	US300	(2) NUWTUBE150	MH2
1000 MCM	VA1MMC	US400	(2) NUWTUBE200	MH2

VA 4/0 B
VA = Style
4/0 = Cable Size
B = Price Key

Mold Information:
- Vertical Downward Cable to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VD



c UL us Listed 467
#6 through 250 MCM

Recommended Accessories:

MSKIT - Magnetic Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VD Instructions

VD Connection

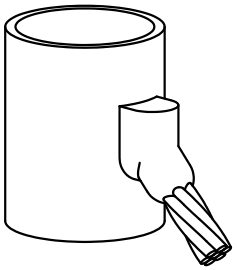
Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VD6B	US45	NUWTUBE45	MH1
#4	VD4B	US65	NUWTUBE65	
#2 Sol	VD2SB	US65	NUWTUBE65	
#2	VD2B	US65	NUWTUBE65	
1/0	VD1/0B	US115	NUWTUBE115	
2/0	VD2/0B	US115	NUWTUBE115	
3/0	VD3/0B	US150	NUWTUBE150	
4/0	VD4/0B	US150	NUWTUBE150	
250 MCM	VD25CMB	US200	NUWTUBE200	
300 MCM	VD3CMB	US200	NUWTUBE200	
350 MCM	VD35CMB	US250	NUWTUBE250	
500 MCM	VD5CMB	US300	(2) NUWTUBE150	

VD 4/0 B
VD = Style
4/0 = Cable Size
B = Price Key

Cable to Steel Pipe

Mold Information:
- Cable Down at 45° to Side of Vertical Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VA



c UL us Listed 467
#6 through 250 MCM

VA to Pipe Connection

Cable Size	Nominal Pipe Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
#6	1-1/4" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA6V1.25X4B VA6V4X6B VA6V6X10B VA6V12X30B VA6B	US45 US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
#4	1-1/2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA4V1.5X4B VA4V4X6B VA4V6X10B VA4V12X30B VA4B	US45 US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
#2 Sol	1-1/2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA2SV1.5X4B VA2SV4X6B VA2SV6X10B VA2SV12X30B VA2SB	US45 US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
#2	1-1/2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA2V1.5X4B VA2V4X6B VA2V6X10B VA2V12X30B VA2B	US45 US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
1/0	2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA1/0V2X4B VA1/0V4X6B VA1/0V6X10B VA1/0V12X30B VA1/0B	US90 US90 US90 US90 US90	NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90	MH1
2/0	2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA2/0V2X4B VA2/0V4X6B VA2/0V6X10B VA2/0V12X30B VA2/0B	US90 US90 US90 US90 US90	NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90	MH1
3/0	2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA3/0V2X4B VA3/0V4X6B VA3/0V6X10B VA3/0V12X30B VA3/0B	US115 US115 US115 US115 US115	NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115	MH1
4/0	2" to 4" Pipe 4" to 6" Pipe 6" to 10" Pipe 12" to 30" Pipe 32" Pipe & Larger	VA4/0V2X4B VA4/0V4X6B VA4/0V6X10B VA4/0V12X30B VA4/0B	US115 US115 US115 US115 US115	NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115	MH1

VA 2S V 1.5X4 B

- VA — Style
- 2S — Cable Size
- V — Pipe Orientation
- 1.5X4 — Nominal Pipe Size
- B — Price Key

- For pipe-size-specific molds, specify the nominal pipe size following the "V" in the part number. Example: VA4/0V6B corresponds to 4/0 STR to 6-inch nominal vertical steel pipe.
- For conductor sizes 250 MCM and smaller in a VA connection use:
  - Flat steel molds for nominal pipe sizes larger than 30"
  - Molds with pipe size designations for nominal pipe sizes 30" and smaller
- For conductor sizes larger than 250 MCM in a VA connection use molds with pipe size designations.

Recommended Accessories:

CSKIT - Chain Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

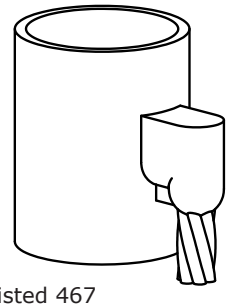
VA to Pipe Instructions

NOTES:
- If welding to fence post, use VDRFP on page 300.
- Thin walled pipe may be unsuitable for exothermic connections. If experiencing burn through issues with the pipe, a solution would be to use a smaller conductor which uses a smaller size weld metal.

Cable to Steel Pipe

Mold Information:
- Vertical Downward Cable to Side of Vertical Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VD



c UL us Listed 467
#6 through 250 MCM

VD 2S V 1.25X4 B

- VD — Style
- 2S — Cable Size
- V — Pipe Orientation
- 1.25X4 — Nominal Pipe Size
- B — Price Key

VD to Pipe Connection

Cable Size	Nominal Pipe Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
#6	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD6V1.25X4B VD6V4X12B VD6V12X30B VD6B	US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
#4	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD4V1.25X4B VD4V4X12B VD4V12X30B VD4B	US45 US45 US45 US45	NUWTUBE45 NUWTUBE45 NUWTUBE45 NUWTUBE45	MH1
#2 Sol	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD2SV1.25X4B VD2SV4X12B VD2SV12X30B VD2SB	US65 US65 US65 US65	NUWTUBE65 NUWTUBE65 NUWTUBE65 NUWTUBE65	MH1
#2	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD2V1.25X4B VD2V4X12B VD2V12X30B VD2B	US65 US65 US65 US65	NUWTUBE65 NUWTUBE65 NUWTUBE65 NUWTUBE65	MH1
1/0	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD1/0V1.25X4B VD1/0V4X12B VD1/0V12X30B VD1/0B	US115 US115 US115 US115	NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115	MH1
2/0	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD2/0V1.25X4B VD2/0V4X12B VD2/0V12X30B VD2/0B	US115 US115 US115 US115	NUWTUBE115 NUWTUBE115 NUWTUBE115 NUWTUBE115	MH1
3/0	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD3/0V1.25X4B VD3/0V4X12B VD3/0V12X30B VD3/0B	US150 US150 US150 US150	NUWTUBE150 NUWTUBE150 NUWTUBE150 NUWTUBE150	MH1
4/0	1-1/4" to 4" Pipe 4" to 12" Pipe 12" to 30" Pipe 32" Pipe & Larger	VD4/0V1.25X4B VD4/0V4X12B VD4/0V12X30B VD4/0B	US150 US150 US150 US150	NUWTUBE150 NUWTUBE150 NUWTUBE150 NUWTUBE150	MH1

- For pipe-size-specific molds, specify the nominal pipe size following the "V" in the part number. Example: VD4/0V6B corresponds to 4/0 STR to 6-inch nominal vertical steel pipe.
- For conductor sizes 250 MCM and smaller in a VD connection use:
  - Flat steel molds for nominal pipe sizes larger than 30"
  - Molds with pipe size designations for nominal pipe sizes 30" and smaller
- For conductor sizes larger than 250 MCM in a VD connection use molds with pipe size designations.

Recommended Accessories:

CSKIT - Chain Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

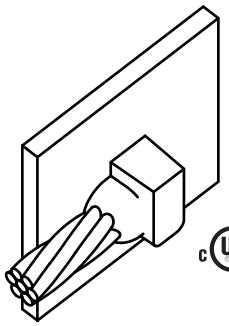
VD to Pipe Instructions

NOTES:
- If welding to fence post, use VDRFP on page 300.
- Thin walled pipe may be unsuitable for exothermic connections. If experiencing burn through issues with the pipe, a solution would be to use a smaller conductor which uses a smaller size weld metal.

Cable to Steel Surface / Pipe

Mold Information:
- Left Hand Horizontal Dead End Cable to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

VL



c UL us Listed 467
#6 through 250 MCM

VL Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VL6B	US45	NUWTUBE45	MH1
#4	VL4B	US45	NUWTUBE45	
#2 Sol	VL2SB	US45	NUWTUBE45	
#2	VL2B	US45	NUWTUBE45	
1/0	VL1/0B	US90	NUWTUBE90	
2/0	VL2/0B	US90	NUWTUBE90	
3/0	VL3/0B	US115	NUWTUBE115	
4/0	VL4/0B	US115	NUWTUBE115	

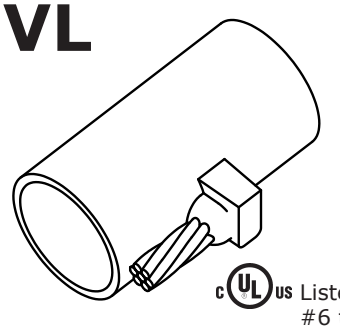
Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VL Instructions

VL 4/0 B
- VL — Style
- 4/0 — Cable Size
- B — Price Key

Mold Information:
- Left Hand Horizontal Dead End Cable to Side of Horizontal Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

VL



c UL us Listed 467
#6 through 250 MCM

VL to Pipe Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VL6*B	US45	NUWTUBE45	MH1
#4	VL4*B	US45	NUWTUBE45	
#2 Sol	VL2S*B	US45	NUWTUBE45	
#2	VL2*B	US45	NUWTUBE45	
1/0	VL1/0*B	US90	NUWTUBE90	
2/0	VL2/0*B	US90	NUWTUBE90	
3/0	VL3/0*B	US115	NUWTUBE115	
4/0	VL4/0*B	US115	NUWTUBE115	

Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

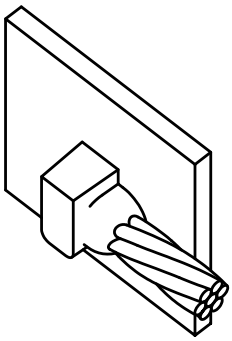
VL to Pipe Instructions

VL 2S H * B
- VL — Style
- 2S — Cable Size
- H — Pipe Orientation
- * — Nominal Pipe Size
- B — Price Key

Cable to Steel Surface / Pipe

Mold Information:
- Right Hand Horizontal Dead End Cable to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

VR



c UL us Listed 467
#6 through 250 MCM

VR Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VR6B	US45	NUWTUBE45	MH1
#4	VR4B	US45	NUWTUBE45	
#2 Sol	VR2SB	US45	NUWTUBE45	
#2	VR2B	US45	NUWTUBE45	
1/0	VR1/0B	US90	NUWTUBE90	
2/0	VR2/0B	US90	NUWTUBE90	
3/0	VR3/0B	US115	NUWTUBE115	
4/0	VR4/0B	US115	NUWTUBE115	

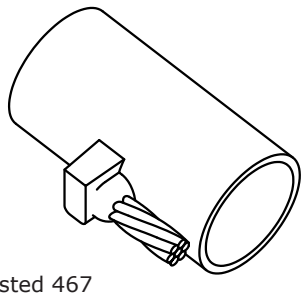
Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VR Instructions

VR 4/0 B
- VR — Style
- 4/0 — Cable Size
- B — Price Key

Mold Information:
- Right Hand Horizontal Dead End Cable to Side of Horizontal Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

VR



c UL us Listed 467
#6 through 250 MCM

VR to Pipe Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VR6*B	US45	NUWTUBE45	MH1
#4	VR4*B	US45	NUWTUBE45	
#2 Sol	VR2S*B	US45	NUWTUBE45	
#2	VR2*B	US45	NUWTUBE45	
1/0	VR1/0*B	US90	NUWTUBE90	
2/0	VR2/0*B	US90	NUWTUBE90	
3/0	VR3/0*B	US115	NUWTUBE115	
4/0	VR4/0*B	US115	NUWTUBE115	
250 MCM	VR25CM*B	US115	NUWTUBE115	

Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

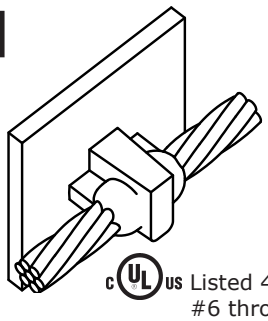
VR to Pipe Instructions

VR 2S H * B
- VR — Style
- 2S — Cable Size
- H — Pipe Orientation
- * — Nominal Pipe Size
- B — Price Key

Cable to Steel Surface / Pipe

Mold Information:
- Horizontal Through Cable to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VH



c UL us Listed 467
#6 through 250 MCM

VH Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VH6B	US65	NUWTUBE65	
#4	VH4B	US65	NUWTUBE65	
#2 Sol	VH2SB	US65	NUWTUBE65	
#2	VH2B	US65	NUWTUBE65	
1/0	VH1/0B	US115	NUWTUBE115	MH1
2/0	VH2/0B	US115	NUWTUBE115	
3/0	VH3/0B	US150	NUWTUBE150	
4/0	VH4/0B	US150	NUWTUBE150	
250 MCM	VH25CMB	US150	NUWTUBE150	

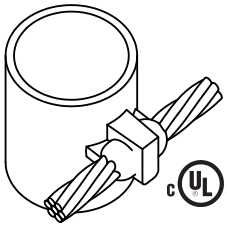
Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VH 1/0 B
- VH — Style
- 1/0 — Cable Size
- B — Price Key

VH Instructions

Mold Information:
- Horizontal Through Cable to Side of Vertical Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VH



c UL us Listed 467
#6 through 250 MCM

VH to Pipe Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VH6V*B	US65	NUWTUBE65	
#4	VH4V*B	US65	NUWTUBE65	
#2 Sol	VH2SV*B	US65	NUWTUBE65	
#2	VH2V*B	US65	NUWTUBE65	
1/0	VH1/0V*B	US115	NUWTUBE115	MH1 & CSKITHSVM
2/0	VH2/0V*B	US115	NUWTUBE115	
3/0	VH3/0V*B	US150	NUWTUBE150	
4/0	VH4/0V*B	US150	NUWTUBE150	
250 MCM	VH25CMV*B	US150	NUWTUBE150	

Recommended Accessories:
MLDSTBLZR - Mold Stabilizer Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

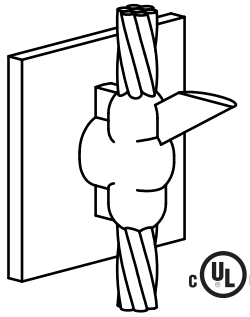
VH 2S V * B
- VH — Style
- 2S — Cable Size
- V — Pipe Orientation
- * — Nominal Pipe Size
- B — Price Key

VH to Pipe Instructions

Cable to Steel Surface / Pipe

Mold Information:
- Vertical Through Cable to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VT



c UL us Listed 467
#6 through 250 MCM

VT Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VT6B	US90	NUWTUBE90	
#4	VT4B	US90	NUWTUBE90	
#2 Sol	VT2SB	US115	NUWTUBE115	
#2	VT2B	US115	NUWTUBE115	
1/0	VT1/0K	US200	NUWTUBE200	MH1
2/0	VT2/0K	US200	NUWTUBE200	
3/0	VT3/0K	US250	NUWTUBE250	
4/0	VT4/0K	US250	NUWTUBE250	
250 MCM	VT25CMK	US250	NUWTUBE250	

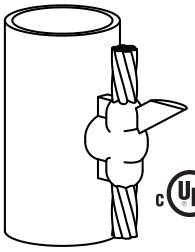
Recommended Accessories:
MSKIT - Magnetic Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VT Instructions

VT 4/0 K
VT: Style; 4/0: Cable Size; K: Price Key

Mold Information:
- Vertical Through Cable to Side of Vertical Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VT



c UL us Listed 467
#6 through 250 MCM

VT to Pipe Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VT6V*B	US90	NUWTUBE90	
#4	VT4V*B	US90	NUWTUBE90	
#2 Sol	VT2SV*B	US115	NUWTUBE115	
#2	VT2V*B	US115	NUWTUBE115	
1/0	VT1/0V*K	US200	NUWTUBE200	MH1
2/0	VT2/0V*K	US200	NUWTUBE200	
3/0	VT3/0V*K	US250	NUWTUBE250	
4/0	VT4/0V*K	US250	NUWTUBE250	
250 MCM	VT25CMV*K	US250	NUWTUBE250	

- For conductor sizes 250 MCM and smaller in a VT connection use:
  - Flat steel molds for nominal pipe sizes larger than 30"
  - Molds with pipe size designations for nominal pipe sizes 30" and smaller
- For conductor sizes larger than 250 MCM in a VT connection use molds with pipe size designations.

Recommended Accessories:
CSKIT - Chain Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

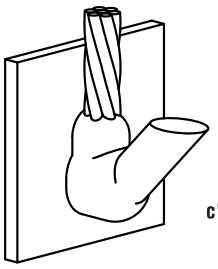
VT to Pipe Instructions

VT 2S V * B
VT: Style; 2S: Cable Size; V: Pipe Orientation; *: Nominal Pipe Size; B: Price Key

Cable to Steel Surface / Pipe

Mold Information:
- Vertical Cable Dead End to Vertical Flat Steel Surface
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VU



c UL us Listed 467
#6 through 250 MCM

VU Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VU6B	US65	NUWTUBE65	MH1
#4	VU4B	US65	NUWTUBE65	MH1
#2 Sol	VU2SB	US65	NUWTUBE65	MH1
#2	VU2B	US65	NUWTUBE65	MH1
1/0	VU1/0B	US150	NUWTUBE150	MH1
2/0	VU2/0B	US150	NUWTUBE150	MH1
3/0	VU3/0K	US200	NUWTUBE200	MH1
4/0	VU4/0K	US200	NUWTUBE200	MH1
250 MCM	VU25CMK	US200	NUWTUBE200	MH1
300 MCM	VU3CMK	US250	NUWTUBE250	MH1
350 MCM	VU35CMK	US300	(2) NUWTUBE150	MH1

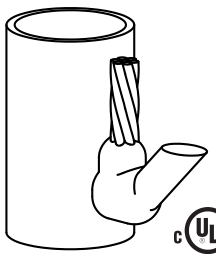
Recommended Accessories:
MSKIT - Magnetic Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VU Instructions

VU 3/0 K
- VU — Style
- 3/0 — Cable Size
- K — Price Key

Mold Information:
- Vertical Cable Dead End to Side of Vertical Steel Pipe
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VU



c UL us Listed 467
#6 through 250 MCM

VU to Pipe Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#6	VU6V*B	US65	NUWTUBE65	
#4	VU4V*B	US65	NUWTUBE65	
#2 Sol	VU2SV*B	US65	NUWTUBE65	
#2	VU2V*B	US65	NUWTUBE65	
1/0	VU1/0V*B	US150	NUWTUBE150	MH1
2/0	VU2/0V*B	US150	NUWTUBE150	
3/0	VU3/0V*K	US200	NUWTUBE200	
4/0	VU4/0V*K	US200	NUWTUBE200	
250 MCM	VU25CMV*K	US200	NUWTUBE200	

- For conductor sizes 250 MCM and smaller in a VU connection use:
  - Flat steel molds for nominal pipe sizes larger than 30"
  - Molds with pipe size designations for nominal pipe sizes 30" and smaller
- For conductor sizes larger than 250 MCM in a VU connection use molds with pipe size designations.

Recommended Accessories:
CSKIT - Chain Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

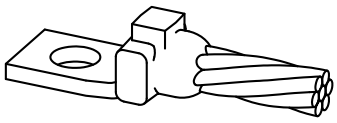
VU to Pipe Instructions

VU 2S V * B
- VU — Style
- 2S — Cable Size
- V — Pipe Orientation
- * — Nominal Pipe Size
- B — Price Key

Cable to Lug or Busbar

Mold Information:
- Butt End Splice of Horizontal Cable to Lug Bent J
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

LBJ



c UL us Listed 467
#6 through 250 MCM

LBJ Connection

Cable Size	Lug Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
#6	1/8 x 1	LBJ6181B	US32	NUWTUBE32	MH1
#4	1/8 x 1	LBJ4181B	US32	NUWTUBE32	MH1
#2 Sol	1/8 x 1	LBJ2S181B	US32	NUWTUBE32	MH1
#2	1/8 x 1	LBJ2181B	US32	NUWTUBE32	MH1
1/0	1/8 x 1	LBJ1/0181B	US45	NUWTUBE45	MH1
2/0	1/8 x 1 3/16 x 1	LBJ2/0181B LBJ2/03161B	US45 US65	NUWTUBE45 NUWTUBE65	MH1
3/0	1/8 x 1 3/16 x 1	LBJ3/0181B LBJ3/03161B	US65 US65	NUWTUBE65 NUWTUBE65	MH1
4/0	1/8 x 1 3/16 x 1	LBJ4/0181B LBJ4/03161B	US65 US65	NUWTUBE65 NUWTUBE65	MH1

• For use with JXL tinned copper bent J lugs.

Recommended Accessories:
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

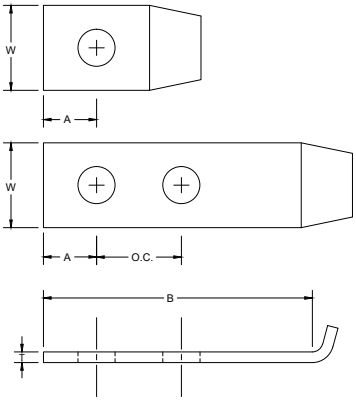
LBJ 2 181 B
- LBJ — Style
- 2 — Cable Size
- 181 — JXL Lug Size
- B — Price Key

LBJ Instructions

Tinned Copper Bent J Lugs

Lug Size	Bent J Part No.	No. of Holes	Screw Size	O.C. Dimension	T	W	A	B
1/8 x 1	JXL1813/8	1	3/8	---	1/8	1	5/8	1-1/4
	JXL181	1	1/2	---	1/8	1	5/8	1-1/4
	JXL1812C1/4	2	1/4	1	1/8	1	5/8	3
	JXL1812C3/8	2	3/8	1	1/8	1	5/8	3
	JXL1812D	2	1/2	1.75	1/8	1	5/8	3
3/16 x 1	JXL3161	1	1/2	---	3/16	1	5/8	1-1/4
	JXL31612D	2	1/2	1.75	3/16	1	5/8	3

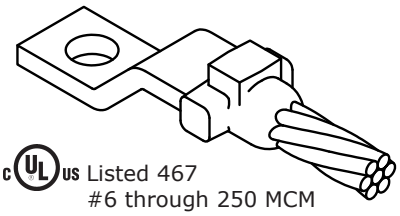
• For use with LBJ molds.



Cable to Lug or Busbar

Mold Information:
- Butt End Splice of Horizontal Cable to Lug or Busbar
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

LE



c UL us Listed 467
#6 through 250 MCM

LE 1/0 141 B

- LE — Style
- 1/0 — Cable Size
- 141 — SXL, OXL, BXL Lug Size
- B — Price Key

LE Connection

Cable Size	Lug Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
#6	1/8 x 1	LE6181B	US45	NUWTUBE45	MH1
#4	1/8 x 1	LE4181B	US45	NUWTUBE45	MH1
#2 Sol	1/8 x 1	LE2S181B	US45	NUWTUBE45	MH1
#2	1/8 x 1	LE2181B	US45	NUWTUBE45	MH1
1/0	1/8 x 1 1/4 x 1	LE1/0181B LE1/0141B	US45 US65	NUWTUBE45 NUWTUBE65	MH1
2/0	1/8 x 1 1/4 x 1	LE2/0181B LE2/0141B	US65 US65	NUWTUBE65 NUWTUBE65	MH1
3/0	3/16 x 1 1/4 x 1	LE3/03161B LE3/0141B	US90 US90	NUWTUBE90 NUWTUBE90	MH1
4/0	3/16 x 1 1/4 x 1 1/4 x 1-1/4 1/4 x 1-1/2	LE4/03161B LE4/0141B LE4/0141.25B LE4/0141.5B	US90 US90 US90 US90	NUWTUBE90 NUWTUBE90 NUWTUBE90 NUWTUBE90	MH1
250 MCM	1/4 x 1 1/4 x 1-1/4 1/4 x 1-1/2	LE25CM141B LE25CM141.25B LE25CM141.5B	US90 US90 US90	NUWTUBE90 NUWTUBE90 NUWTUBE90	MH1
500 MCM	1/4 x 1-1/2 1/4 x 2 3/8 x 1 3/8 x 1-1/2 3/8 x 2	LE5CM141.5B LE5CM142B LE5CM381B LE5CM381.5B LE5CM382B	US200 US200 US200 US200 US300	NUWTUBE200 NUWTUBE200 NUWTUBE200 NUWTUBE200 (2) NUWTUBE150	MH1
750 MCM	1/4 x 2 3/8 x 1-1/2 3/8 x 2	LE75CM142B LE75CM381.5B LE75CM382B	US300 US300 US300	(2) NUWTUBE150 (2) NUWTUBE150 (2) NUWTUBE150	MH1
1000 MCM	3/8 x 2 7/16 x 2 1/2 x 2	LE1MM382C LE1MM7162C LE1MM122C	US400 US400 US500	(2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE250	MH2

- For use with SXL, OXL, and BXL tinned copper lugs.

Recommended Accessories:

CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

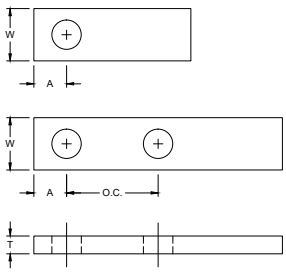
LE Instructions

Tinned Copper Lugs

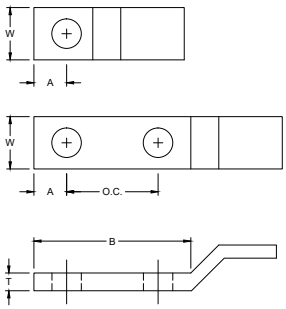
Straight & Offset

Lug Size	Straight Part No.	Offset Part No.	No. of Holes	Screw Size	O.C. Dimension	T	W	A	B
1/8 x 1	SXL181	OXL181	1	3/8	---	1/8	1	1/2	7/8
	SXL1812B	OXL1812B	2	3/8	.75	1/8	1	5/8	3
	SXL1812C	OXL1812C	2	1/2	1	1/8	1	5/8	3
	SXL1812D	OXL1812D	2	1/2	1.75	1/8	1	5/8	3
3/16 x 1	SXL3161	OXL3161	1	3/8	---	3/16	1	9/16	1-1/8
	SXL31612B	OXL31612B	2	3/8	.75	3/16	1	5/8	3
	SXL31612C	OXL31612C	2	1/2	1	3/16	1	5/8	3
	SXL31612D	OXL31612D	2	1/2	1.75	3/16	1	5/8	3
1/4 x 1	SXL141	OXL141	1	1/2	---	1/4	1	5/8	1-1/8
	SXL1412B	OXL1412B	2	3/8	.75	1/4	1	5/8	3
	SXL1412C	OXL1412C	2	1/2	1	1/4	1	5/8	3
	SXL1412D	OXL1412D	2	1/2	1.75	1/4	1	5/8	3
1/4 x 1-1/2	SXL141.5	OXL141.5	1	5/8	---	1/4	1-1/2	3/4	1-1/2
	SXL141.52B	OXL141.52B	2	3/8	.75	1/4	1-1/2	5/8	3
	SXL141.52C	OXL141.52C	2	1/2	1	1/4	1-1/2	5/8	3
	SXL141.52D	OXL141.52D	2	1/2	1.75	1/4	1-1/2	5/8	3
1/4 x 2	SXL1422B	OXL1422B	2	3/8	.75	1/4	2	5/8	3
	SXL1422C	OXL1422C	2	1/2	1	1/4	2	5/8	3
	SXL1422D	OXL1422D	2	1/2	1.75	1/4	2	5/8	3
3/8 x 1-1/2	SXL381.5	OXL381.5	1	5/8	---	3/8	1-1/2	3/4	1-1/2
	SXL381.52B	OXL381.52B	2	3/8	.75	3/8	1-1/2	5/8	3
	SXL381.52C	OXL381.52C	2	1/2	1	3/8	1-1/2	5/8	3
	SXL381.52D	OXL381.52D	2	1/2	1.75	3/8	1-1/2	5/8	3
3/8 x 2	SXL382	OXL382	1	5/8	---	3/8	2	1	2-1/8
	SXL3822B	OXL3822B	2	3/8	.75	3/8	2	5/8	3
	SXL3822C	OXL3822C	2	1/2	1	3/8	2	5/8	3
	SXL3822D	OXL3822D	2	1/2	1.75	3/8	2	5/8	3

SXL



OXL

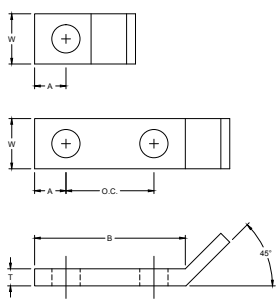


• For use with LE molds.

Tinned Copper Bent Lugs

Lug Size	Bent Part No.	No. of Holes	Screw Size	O.C. Dimension	T	W	A	B
1/8 x 1	BXL181	1	3/8	---	1/8	1	7/16	7/8
	BXL1812B	2	3/8	.75	1/8	1	5/8	3
	BXL1812C	2	1/2	1	1/8	1	5/8	3
	BXL1812D	2	1/2	1.75	1/8	1	5/8	3
3/16 x 1	BXL3161	1	1/2	---	3/16	1	5/8	1-1/4
	BXL31612B	2	3/8	.75	3/16	1	5/8	3
	BXL31612C	2	1/2	1	3/16	1	5/8	3
	BXL31612D	2	1/2	1.75	3/16	1	5/8	3
1/4 x 1	BXL141	1	1/2	---	1/4	1	5/8	1-1/4
	BXL1412B	2	3/8	.75	1/4	1	5/8	3
	BXL1412C	2	1/2	1	1/4	1	5/8	3
	BXL1412D	2	1/2	1.75	1/4	1	5/8	3
1/4 x 1-1/2	BXL141.5	1	5/8	---	1/4	1-1/2	3/4	1-1/2
	BXL141.52B	2	3/8	.75	1/4	1-1/2	5/8	3
	BXL141.52C	2	1/2	1	1/4	1-1/2	5/8	3
	BXL141.52D	2	1/2	1.75	1/4	1-1/2	5/8	3

BXL

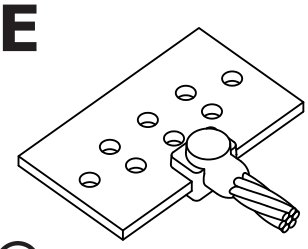


• For use with LE molds.

Cable to Busbar

Mold Information:
- Horizontal Cable Tap to Edge of Horizontal Flat Busbar
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

BE



c UL us Listed 467
#6 through 250 MCM

BE Connection

Busbar Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
			UltraShot	NuwTube	
1/4 x 1-1/2 & WIDER	#6	BE141.56B	US65	NUWTUBE65	MH1
	#4	BE141.54B	US65	NUWTUBE65	
	#2 Sol	BE141.52SB	US65	NUWTUBE65	
	#2	BE141.52B	US65	NUWTUBE65	
	1/0	BE141.51/0B	US90	NUWTUBE90	
	2/0	BE141.52/0B	US90	NUWTUBE90	
	3/0	BE141.53/0B	US90	NUWTUBE90	
	4/0	BE141.54/0B	US90	NUWTUBE90	
	250 MCM	BE141.525CMB	US115	NUWTUBE115	
	300 MCM	BE141.53CMB	US115	NUWTUBE115	
	350 MCM	BE141.535CMB	US150	NUWTUBE150	
	500 MCM	BE141.55CMB	US200	NUWTUBE200	
3/8 x 1-1/2 & WIDER	1/0	BE381.51/0B	US90	NUWTUBE90	MH1
	2/0	BE381.52/0B	US90	NUWTUBE90	MH1
	3/0	BE381.53/0B	US115	NUWTUBE115	MH1
	4/0	BE381.54/0B	US115	NUWTUBE115	MH1
	250 MCM	BE381.525CMB	US150	NUWTUBE150	MH1
	300 MCM	BE381.53CMB	US150	NUWTUBE150	MH1
	350 MCM	BE381.535CMB	US200	NUWTUBE200	MH1
	500 MCM	BE381.55CMB	US250	NUWTUBE250	MH1
	750 MCM	BE381.575CMB	US300	(2) NUWTUBE150	MH1
	1000 MCM	BE381.51MMC	US400	(2) NUWTUBE200	MH2

BE 14 1.5 6 B

- BE — Style
- 14 — Busbar Thickness
- 1.5 — Busbar Width
- 6 — Cable Size
- B — Price Key

Recommended Accessories:

CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

BE Instructions

Cable to Reinforcing Steel

Ultraweld Connections Used for Grounding Reinforcing Steel

The Ultraweld process is ideal for providing permanent connections of grounding conductors and lightning protection conductors to reinforcing steel. Exothermically welding to the reinforcing steel ensures that the concrete encased connection will last the duration of the structure. To ensure that the connection is made properly, the mill scale must be removed from the reinforcing steel in the area of the connection. In addition to the normal materials used to make an Ultraweld connection, packing material is also required. The packing material serves as a sealant barrier between the mold and the reinforcing steel and thus prevents weld metal leakage. A piece of packing material is good for one connection.

Ultraweld Connections to Structural Reinforcing Steel

The Ultraweld process is only to be used for attaching conductors to reinforcing steel and not as a means to provide a structural welded joint of the reinforcing steel itself. The welding of ground conductors to reinforcing steel using the Ultraweld process will not be harmful if the stresses in the reinforcing steel are below its yield point. Design stresses for reinforcing steel are normally below 60% of the nominal yield strength thus Ultraweld exothermic welding process should not be detrimental under design stresses. In practice it is best to make grounding attachments to reinforcing steel in areas away from the point of maximum stress. It is best to make connections near the free end of the reinforcing steel.

Connections made to Reinforcing Steel require packing material.

Packing Material or Wrap Sleeve(s) are necessary when making Ultraweld connections to reinforcing steel. The two types of material used are CERPM or WRPSLV.

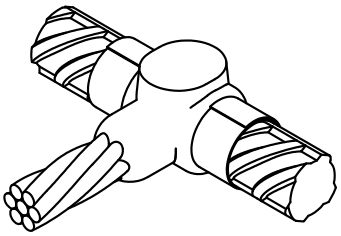
Ensure to specify Packing Material Part Number when ordering Mold and Weld Metal.

Packing material details are listed below each mold table.

Cable to Reinforcing Steel

Mold Information:
- Tee of Horizontal Through Reinforcing Steel & Horizontal Tap Cable
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

RB



c UL us Listed 467
#6 through 4/0

RB 4 4/0 B
- RB — Style
- 4 — Reinforcing Steel Size
- 4/0 — Cable Size
- B — Price Key

RB Connection

Size	Cable Size	Mold Part No.	Packing Mat'l No. (2 per weld)	Weld Metal		Required Handle
				UltraShot	NuwTube	
3	#6	RB36B	(2) WRPSLV	US45	NUWTUBE45	MH1
	#4	RB34B	(2) WRPSLV	US45	NUWTUBE45	
	#2 Sol	RB32SB	(2) WRPSLV	US65	NUWTUBE65	
	#2	RB32B	(2) WRPSLV	US65	NUWTUBE65	
	1/0	RB31/0B	(2) WRPSLV	US90	NUWTUBE90	
	2/0	RB32/0B	(2) WRPSLV	US90	NUWTUBE90	
	3/0	RB33/0B	(2) WRPSLV	US115	NUWTUBE115	
	4/0	RB34/0B	(2) WRPSLV	US115	NUWTUBE115	
4	#6	RB46B	(2) WRPSLV	US45	NUWTUBE45	MH1
	#4	RB44B	(2) WRPSLV	US45	NUWTUBE45	
	#2 Sol	RB42SB	(2) WRPSLV	US65	NUWTUBE65	
	#2	RB42B	(2) WRPSLV	US65	NUWTUBE65	
	1/0	RB41/0B	(2) WRPSLV	US90	NUWTUBE90	
	2/0	RB42/0B	(2) WRPSLV	US90	NUWTUBE90	
	3/0	RB43/0B	(2) WRPSLV	US115	NUWTUBE115	
	4/0	RB44/0B	(2) WRPSLV	US115	NUWTUBE115	
5	#6	RB56B	(2) WRPSLV	US90	NUWTUBE90	MH1
	#4	RB54B	(2) WRPSLV	US90	NUWTUBE90	
	#2 Sol	RB52SB	(2) WRPSLV	US90	NUWTUBE90	
	#2	RB52B	(2) WRPSLV	US90	NUWTUBE90	
	1/0	RB51/0B	(2) WRPSLV	US115	NUWTUBE115	
	2/0	RB52/0B	(2) WRPSLV	US115	NUWTUBE115	
	3/0	RB53/0B	(2) WRPSLV	US150	NUWTUBE150	
	4/0	RB54/0B	(2) WRPSLV	US150	NUWTUBE150	
6	#6	RB66B	(2) WRPSLV	US90	NUWTUBE90	MH1
	#4	RB64B	(2) WRPSLV	US90	NUWTUBE90	
	#2 Sol	RB62SB	(2) WRPSLV	US90	NUWTUBE90	
	#2	RB62B	(2) WRPSLV	US90	NUWTUBE90	
	1/0	RB61/0B	(2) WRPSLV	US115	NUWTUBE115	
	2/0	RB62/0B	(2) WRPSLV	US115	NUWTUBE115	
	3/0	RB63/0B	(2) WRPSLV	US150	NUWTUBE150	
	4/0	RB64/0B	(2) WRPSLV	US150	NUWTUBE150	

NOTES:
- **Copper Wrap Sleeve (WRPSLV)** is wrapped around the reinforcing steel.
- All Packing Material must be used for one connection only.

Recommended Accessories:

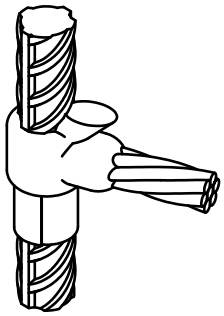
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for Weld Metal 150 & Larger

RB Instructions

Cable to Reinforcing Steel

Mold Information:
- Tee of Vertical Through Reinforcing Steel & Horizontal Tap Cable
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

RE



c UL us Listed 467
#6 through 4/0

RE 5 2/0 B

- RE — Style
- 5 — Reinforcing Steel Size
- 2/0 — Cable Size
- B — Price Key

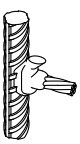
RE Connection

Size	Cable Size	Mold Part No.	Packing Mat'l No. (1 per weld)	Weld Metal		Required Handle
				UltraShot	NuwTube	
3	#6	RE36B	WRPSLV	US45	NUWTUBE45	MH1
	#4	RE34B	WRPSLV	US65	NUWTUBE65	
	#2 Sol	RE32SB	WRPSLV	US65	NUWTUBE65	
	#2	RE32B	WRPSLV	US65	NUWTUBE65	
	1/0	RE31/0B	WRPSLV	US115	NUWTUBE115	
	2/0	RE32/0B	WRPSLV	US115	NUWTUBE115	
	3/0	RE33/0B	WRPSLV	US150	NUWTUBE150	
	4/0	RE34/0B	WRPSLV	US150	NUWTUBE150	
4	#6	RE46B	WRPSLV	US45	NUWTUBE45	MH1
	#4	RE44B	WRPSLV	US65	NUWTUBE65	
	#2 Sol	RE42SB	WRPSLV	US65	NUWTUBE65	
	#2	RE42B	WRPSLV	US65	NUWTUBE65	
	1/0	RE41/0B	WRPSLV	US115	NUWTUBE115	
	2/0	RE42/0B	WRPSLV	US115	NUWTUBE115	
	3/0	RE43/0B	WRPSLV	US150	NUWTUBE150	
	4/0	RE44/0B	WRPSLV	US150	NUWTUBE150	
5	#6	RE56B	WRPSLV	US45	NUWTUBE45	MH1
	#4	RE54B	WRPSLV	US65	NUWTUBE65	
	#2 Sol	RE52SB	WRPSLV	US65	NUWTUBE65	
	#2	RE52B	WRPSLV	US65	NUWTUBE65	
	1/0	RE51/0B	WRPSLV	US115	NUWTUBE115	
	2/0	RE52/0B	WRPSLV	US115	NUWTUBE115	
	3/0	RE53/0B	WRPSLV	US150	NUWTUBE150	
	4/0	RE54/0B	WRPSLV	US150	NUWTUBE150	
6	#6	RE66B	WRPSLV	US45	NUWTUBE45	MH1
	#4	RE64B	WRPSLV	US65	NUWTUBE65	
	#2 Sol	RE62SB	WRPSLV	US65	NUWTUBE65	
	#2	RE62B	WRPSLV	US65	NUWTUBE65	
	1/0	RE61/0B	WRPSLV	US115	NUWTUBE115	
	2/0	RE62/0B	WRPSLV	US115	NUWTUBE115	
	3/0	RE63/0B	WRPSLV	US150	NUWTUBE150	
	4/0	RE64/0B	WRPSLV	US150	NUWTUBE150	
7 & Larger	#6	RE7L6K	CERPM3	US45	NUWTUBE45	MH1 & CSKIT
	#4	RE7L4K	CERPM3	US65	NUWTUBE65	
	#2 Sol	RE7L2SK	CERPM3	US65	NUWTUBE65	
	#2	RE7L2K	CERPM3	US65	NUWTUBE65	
	1/0	RE7L1/0K	CERPM3	US115	NUWTUBE115	
	2/0	RE7L2/0K	CERPM3	US115	NUWTUBE115	
	3/0	RE7L3/0K	CERPM3	US150	NUWTUBE150	
	4/0	RE7L4/0K	CERPM3	US150	NUWTUBE150	

Recommended Accessories:

CSKIT - Chain Support Kit for 7 & Larger
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

RE Instructions



7L

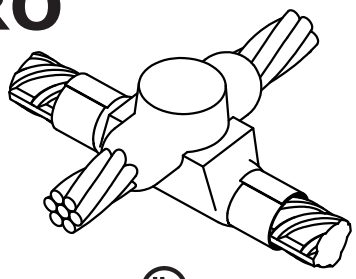
NOTES:

- **Copper Wrap Sleeve (WRPSLV)** is wrapped around the reinforcing steel.
- **Ceramic Fiber (CERPM)** is held on the side of reinforcing steel.
- All Packing Material must be used for one connection only.

Cable to Reinforcing Steel

Mold Information:
- Cross of Horizontal Cable Lapped Over Horizontal Reinforcing Steel
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

RO



c UL us Listed 467
#6 through 4/0

RO 4 1/0 Q

- RO — Style
- 4 — Reinforcing Steel Size
- 1/0 — Cable Size
- Q — Price Key

RO Connection

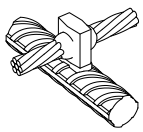
Size	Cable Size	Mold Part No.	Packing Mat'l No.	Weld Metal		Required Handle
				UltraShot	NuwTube	
3	#6	RO36B	(2) WRPSLV	US65	NUWTUBE65	MH1
	#4	RO34B	(2) WRPSLV	US65	NUWTUBE65	
	#2 Sol	RO32SB	(2) WRPSLV	US90	NUWTUBE90	
	#2	RO32B	(2) WRPSLV	US90	NUWTUBE90	
	1/0	RO31/0Q	(2) WRPSLV	US115	NUWTUBE115	
	2/0	RO32/0Q	(2) WRPSLV	US115	NUWTUBE115	
	3/0	RO33/0Q	(2) WRPSLV	US150	NUWTUBE150	
	4/0	RO34/0Q	(2) WRPSLV	US150	NUWTUBE150	
4	#6	RO46B	(2) WRPSLV	US65	NUWTUBE65	MH1
	#4	RO44B	(2) WRPSLV	US65	NUWTUBE65	
	#2 Sol	RO42SB	(2) WRPSLV	US90	NUWTUBE90	
	#2	RO42B	(2) WRPSLV	US90	NUWTUBE90	
	1/0	RO41/0Q	(2) WRPSLV	US115	NUWTUBE115	
	2/0	RO42/0Q	(2) WRPSLV	US115	NUWTUBE115	
	3/0	RO43/0Q	(2) WRPSLV	US150	NUWTUBE150	
	4/0	RO44/0Q	(2) WRPSLV	US150	NUWTUBE150	
5	#6	RO56B	(2) WRPSLV	US65	NUWTUBE65	MH1
	#4	RO54B	(2) WRPSLV	US65	NUWTUBE65	
	#2 Sol	RO52SB	(2) WRPSLV	US90	NUWTUBE90	
	#2	RO52B	(2) WRPSLV	US90	NUWTUBE90	
	1/0	RO51/0Q	(2) WRPSLV	US115	NUWTUBE115	
	2/0	RO52/0Q	(2) WRPSLV	US115	NUWTUBE115	
	3/0	RO53/0Q	(2) WRPSLV	US150	NUWTUBE150	
	4/0	RO54/0Q	(2) WRPSLV	US150	NUWTUBE150	
6 & Larger	#6	RO6L6B	(1) CERPM1	US65	NUWTUBE65	MH1 & CSKITHPVS
	#4	RO6L4B	(1) CERPM1	US65	NUWTUBE65	
	#2 Sol	RO6L2SB	(1) CERPM1	US90	NUWTUBE90	
	#2	RO6L2B	(1) CERPM1	US90	NUWTUBE90	
	1/0	RO6L1/0B	(1) CERPM2	US115	NUWTUBE115	
	2/0	RO6L2/0B	(1) CERPM2	US115	NUWTUBE115	
	3/0	RO6L3/0B	(1) CERPM2	US150	NUWTUBE150	
	4/0	RO6L4/0B	(1) CERPM2	US150	NUWTUBE150	

NOTES:
- **Copper Wrap Sleeve (WRPSLV)** is wrapped around the reinforcing steel.
- **Ceramic Fiber (CERPM)** is held on the side of reinforcing steel.
- All Packing Material must be used for one connection only.

Recommended Accessories:

CSKITHPVS - Chain Support Kit for 6 & Larger
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "Q" molds Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for price key "Q" molds Weld Metal 150 & Larger

RO Instructions

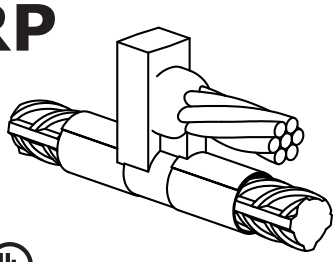


6L

Cable to Reinforcing Steel

Mold Information:
- Parallel Cable Tap of Horizontal Cable to Through Horizontal Reinforcing Steel
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

RP



c UL us Listed 467
#6 through 4/0

RP Connection

Size	Cable Size	Mold Part No.	Packing Mat'l No.	Weld Metal		Required Handle
				UltraShot	NuwTube	
3	#6	RP36B	(2) WRPSLV	US25	NUWTUBE25	MH1
	#4	RP34B	(2) WRPSLV	US32	NUWTUBE32	
	#2 Sol	RP32SB	(2) WRPSLV	US45	NUWTUBE45	
	#2	RP32B	(2) WRPSLV	US45	NUWTUBE45	
	1/0	RP31/0B	(2) WRPSLV	US90	NUWTUBE90	
	2/0	RP32/0B	(2) WRPSLV	US90	NUWTUBE90	
	3/0	RP33/0B	(2) WRPSLV	US115	NUWTUBE115	
	4/0	RP34/0B	(2) WRPSLV	US115	NUWTUBE115	
4 & Larger	#6	RP4L6A	(1) CERPM1	US25	NUWTUBE25	Included
	#4	RP4L4A	(1) CERPM1	US32	NUWTUBE32	
	#2 Sol	RP4L2SA	(1) CERPM1	US45	NUWTUBE45	
	#2	RP4L2A	(1) CERPM1	US45	NUWTUBE45	
4	1/0	RP41/0B	(2) WRPSLV	US90	NUWTUBE90	MH1
	2/0	RP42/0B	(2) WRPSLV	US90	NUWTUBE90	
	3/0	RP43/0B	(2) WRPSLV	US115	NUWTUBE115	
	4/0	RP44/0B	(2) WRPSLV	US115	NUWTUBE115	
5	1/0	RP51/0B	(2) WRPSLV	US90	NUWTUBE90	MH1
	2/0	RP52/0B	(2) WRPSLV	US90	NUWTUBE90	
	3/0	RP53/0B	(2) WRPSLV	US115	NUWTUBE115	
	4/0	RP54/0B	(2) WRPSLV	US115	NUWTUBE115	
6 & Larger	1/0	RP6L1/0B	(1) CERPM2	US90	NUWTUBE90	MH1 & CSKITHP
	2/0	RP6L2/0B	(1) CERPM2	US90	NUWTUBE90	
	3/0	RP6L3/0B	(1) CERPM2	US115	NUWTUBE115	
	4/0	RP6L4/0B	(1) CERPM2	US115	NUWTUBE115	

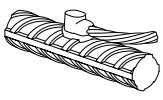
RP 6L 2/0 B
- RP — Style
- 6L — Reinforcing Steel Size
- 2/0 — Cable Size
- B — Price Key

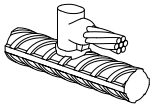
NOTES:
- **Copper Wrap Sleeve (WRPSLV)** is wrapped around the reinforcing steel.
- **Ceramic Fiber (CERPM)** is held on the side of reinforcing steel.
- All Packing Material must be used for one connection only.

Recommended Accessories:

CSKITHP - Chain Support Kit for 6 & Larger
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "A" molds Weld Metal 25-115

RP Instructions

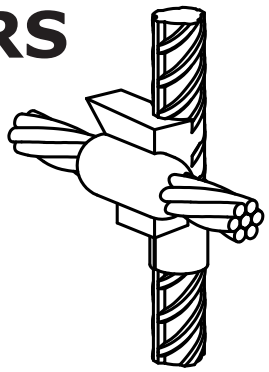

4L


6L

Cable to Reinforcing Steel

Mold Information:
- Horizontal Through Cable to Side of Vertical Reinforcing Steel
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

RS



c UL us Listed 467
#6 through 4/0

RS 6 4/0 P
- RS — Style
- 6 — Reinforcing Steel Size
- 4/0 — Cable Size
- P — Price Key

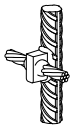
RS Connection

Size	Cable Size	Mold Part No.	Packing Mat'l No. (1 per weld)	Weld Metal		Required Handle
				UltraShot	NuwTube	
3	#6	RS36P	WRPSLV	US90	NUWTUBE90	MH1
	#4	RS34P	WRPSLV	US90	NUWTUBE90	
	#2 Sol	RS32SP	WRPSLV	US90	NUWTUBE90	
	#2	RS32P	WRPSLV	US90	NUWTUBE90	
	1/0	RS31/0P	WRPSLV	US115	NUWTUBE115	
	2/0	RS32/0P	WRPSLV	US115	NUWTUBE115	
	3/0	RS33/0P	WRPSLV	US150	NUWTUBE150	
	4/0	RS34/0P	WRPSLV	US150	NUWTUBE150	
4	#6	RS46P	WRPSLV	US90	NUWTUBE90	MH1
	#4	RS44P	WRPSLV	US90	NUWTUBE90	
	#2 Sol	RS42SP	WRPSLV	US90	NUWTUBE90	
	#2	RS42P	WRPSLV	US90	NUWTUBE90	
	1/0	RS41/0P	WRPSLV	US115	NUWTUBE115	
	2/0	RS42/0P	WRPSLV	US115	NUWTUBE115	
	3/0	RS43/0P	WRPSLV	US150	NUWTUBE150	
	4/0	RS44/0P	WRPSLV	US150	NUWTUBE150	
5	#6	RS56P	WRPSLV	US90	NUWTUBE90	MH1
	#4	RS54P	WRPSLV	US90	NUWTUBE90	
	#2 Sol	RS52SP	WRPSLV	US90	NUWTUBE90	
	#2	RS52P	WRPSLV	US90	NUWTUBE90	
	1/0	RS51/0P	WRPSLV	US115	NUWTUBE115	
	2/0	RS52/0P	WRPSLV	US115	NUWTUBE115	
	3/0	RS53/0P	WRPSLV	US150	NUWTUBE150	
	4/0	RS54/0P	WRPSLV	US150	NUWTUBE150	
6	#6	RS66P	WRPSLV	US90	NUWTUBE90	MH1
	#4	RS64P	WRPSLV	US90	NUWTUBE90	
	#2 Sol	RS62SP	WRPSLV	US90	NUWTUBE90	
	#2	RS62P	WRPSLV	US90	NUWTUBE90	
	1/0	RS61/0P	WRPSLV	US115	NUWTUBE115	
	2/0	RS62/0P	WRPSLV	US115	NUWTUBE115	
	3/0	RS63/0P	WRPSLV	US150	NUWTUBE150	
	4/0	RS64/0P	WRPSLV	US150	NUWTUBE150	
7 & Larger	#6	RS7L6B	CERPM3	US90	NUWTUBE90	MH1 & CSKITHSVM
	#4	RS7L4B	CERPM3	US90	NUWTUBE90	
	#2 Sol	RS7L2SB	CERPM3	US90	NUWTUBE90	
	#2	RS7L2B	CERPM3	US90	NUWTUBE90	
	1/0	RS7L1/0B	CERPM3	US115	NUWTUBE115	
	2/0	RS7L2/0B	CERPM3	US115	NUWTUBE115	
	3/0	RS7L3/0B	CERPM3	US150	NUWTUBE150	
	4/0	RS7L4/0B	CERPM3	US150	NUWTUBE150	

Recommended Accessories:

CSKITHSVM - Chain Support Kit for 7 & Larger
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
MCSPD25/115 - Mold Cleaning Spade for price key "B" molds Weld Metal 25-115
MCSPD150/400 - Mold Cleaning Spade for price key "B" molds Weld Metal 150 & Larger

RS Instructions



7L

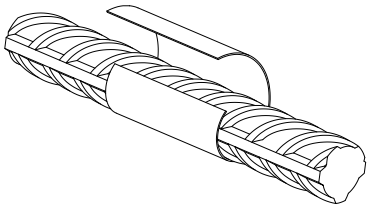
NOTES:

- **Copper Wrap Sleeve (WRPSLV)** is wrapped around the reinforcing steel.
- **Ceramic Fiber (CERPM)** is held on the side of reinforcing steel.
- All Packing Material must be used for one connection only.

Packing Material for Reinforcing Steel Molds

Copper Wrap Sleeves





Part No.	Box Qty.	Approx. Box Wt. (lbs.)
WRPSLV	50	0.5

- Wrap Sleeves are a required accessory for wrapping around reinforcing steel for certain connection styles to prevent molten weld metal leakage.
- If a CERPM is not required for a reinforcing steel connection then WRPSLV's must be used instead.
- Wrap Sleeves can be used when welding cables smaller than indicated on mold tag.
- When the cable opening in the mold is larger than the cable, copper Wrap Sleeves are wrapped around the cable until the diameter is about the same size as the mold cable opening.

Ceramic Reinforcing Steel Packing Material



Part No.	Box Qty.	Approx. Box Wt. (lbs.)
CERPM1	25	0.3
CERPM2	25	0.3
CERPM3	25	0.3

- CERPM's are held against the side of the reinforcing steel to prevent molten weld metal leakage.
- If a WRPSLV is not required for a reinforcing steel connection then a CERPM must be used instead.

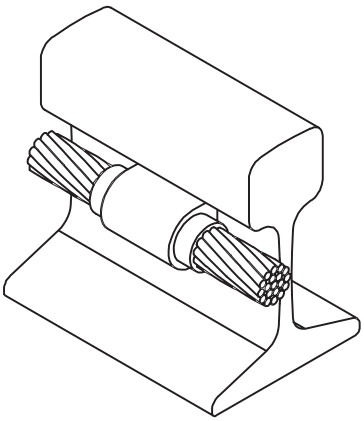
Cable to Rail

Web Grounding Connections

Mold Information:

- Rail Mold Vertical Web Horizontal Cable Through
- Welded grounding connections to the web of 60 lb. to 141 lb. standard rails.
- If the ampacity requirement cannot be met with a single conductor listed, then two or more smaller conductors can be used.
- Molds listed are for concentric conductors.
- Mold frame includes adjusting screws to position the mold at the neutral axis of the rail.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

RMVH



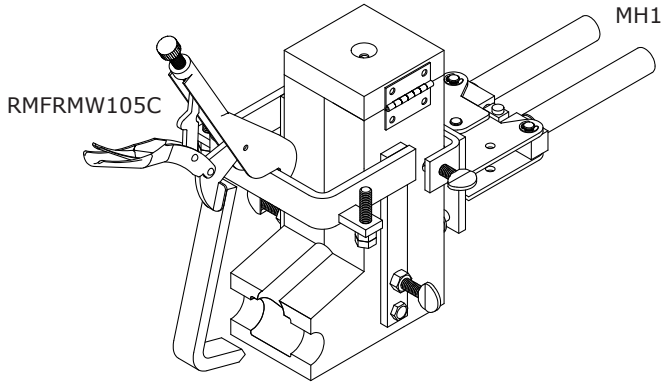
RMVH Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#4 Concentric	RMVH4WEBK	US90R	NUWTUBE90R	MH1 & RMFRMW105C
#2 Concentric	RMVH2WEBK	US90R	NUWTUBE90R	
1/0 Concentric	RMVH1/0WEBK	US115R	NUWTUBE115R	
2/0 Concentric	RMVH2/0WEBK	US115R	NUWTUBE115R	
3/0 Concentric	RMVH3/0WEBK	US150R	NUWTUBE150R	
4/0 Concentric	RMVH4/0WEBK	US150R	NUWTUBE150R	

- Ultraweld exothermic materials meet requirements of AREMA 8.1.34.

RMVH 2/0 WEB K

- RMVH — Style
- 2/0 — Cable Size
- WEB — Cable Position on Rail
- K — Price Key



The adjusting screws on mold frame position conductor at neutral axis of rail where stresses are minimal.

Recommended Accessories:

CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
GRDWL - Grinding Wheel

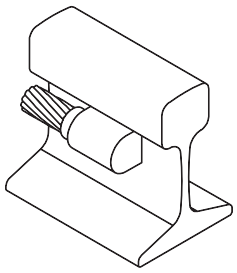
RMVH Instructions

Cable to Rail

Web Grounding Connections

Mold Information:
- Rail Mold Vertical Web Cable Dead End Left
- Welded grounding connections to the web of 60 lb. to 141 lb. standard rails.
- Molds listed are for concentric stranded cable.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

RMVL



RMVL Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#4 Concentric	RMVL4WEBK	US65R	NUWTUBE65R	MH1 & RMFRMW105C
#2 Concentric	RMVL2WEBK	US65R	NUWTUBE65R	
1/0 Concentric	RMVL1/0WEBK	US90R	NUWTUBE90R	
2/0 Concentric	RMVL2/0WEBK	US90R	NUWTUBE90R	
3/0 Concentric	RMVL3/0WEBK	US115R	NUWTUBE115R	
4/0 Concentric	RMVL4/0WEBK	US115R	NUWTUBE115R	

- Ultraweld exothermic materials meet requirements of AREMA 8.1.34.

Recommended Accessories:

CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
GRDWL - Grinding Wheel

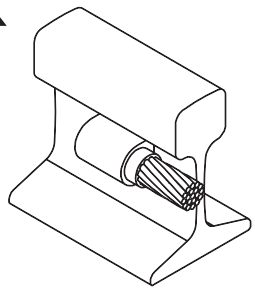
RMVL Instructional Videos

RMVL 2/0 WEB K

- RMVL — Style
- 2/0 — Cable Size
- WEB — Cable Position on Rail
- K — Price Key

Mold Information:
- Rail Mold Vertical Web Cable Dead End Right
- Welded grounding connections to the web of 60 lb. to 141 lb. standard rails.
- Molds listed are for concentric stranded cable.
- Mold Sealer (MLDSLR) is required for conductors larger than #2.

RMVR



RMVR Connection

Cable Size	Mold Part No.	Weld Metal		Required Handle
		UltraShot	NuwTube	
#4 Concentric	RMVR4WEBK	US65R	NUWTUBE65R	MH1 & RMFRMW105C
#2 Concentric	RMVR2WEBK	US65R	NUWTUBE65R	
1/0 Concentric	RMVR1/0WEBK	US90R	NUWTUBE90R	
2/0 Concentric	RMVR2/0WEBK	US90R	NUWTUBE90R	
3/0 Concentric	RMVR3/0WEBK	US115R	NUWTUBE115R	
4/0 Concentric	RMVR4/0WEBK	US115R	NUWTUBE115R	

- Ultraweld exothermic materials meet requirements of AREMA 8.1.34.

Recommended Accessories:

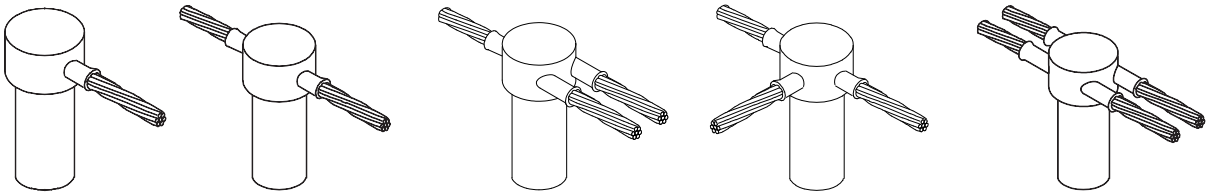
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush
GRDWL - Grinding Wheel

RMVR Instructions

RMVR 2/0 WEB K

- RMVR — Style
- 2/0 — Cable Size
- WEB — Cable Position on Rail
- K — Price Key

Uni-Shots - UltraShot



G11 **G21** **G31** **G31*** **G41**

Type	Cable Sizes		Ground Rod			
	Solid	Stranded	5/8 Copper Bonded	5/8 Full	3/4 Copper Bonded	3/4 Full
G11	#6, #8	#8	G11588US	G1158F8US	G11348US	G1134F8US
G11	#3, #4	#4, #6	G11584US	G1158F4US	G11344US	G1134F4US
G11	#1, #2	#2, #3	G11582US	G1158F2US	G11342US	G1134F2US
G11	2/0, 1/0	1/0, #1	G11581/0US	G1158F1/0US	G11341/0US	G1134F1/0US
G11	-	2/0	G11582/0US	G1158F2/0US	G11342/0US	G1134F2/0US
G11	-	4/0	G11584/0US	G1158F4/0US	G11344/0US	G1134F4/0US
G21	#6, #8	#8	G21588US	G2158F8US	G21348US	G2134F8US
G21	#3, #4	#4, #6	G21584US	G2158F4US	G21344US	G2134F4US
G21	#1, #2	#2, #3	G21582US	G2158F2US	G21342US	G2134F2US
G21	2/0, 1/0	1/0, #1	G21581/0US	G2158F1/0US	G21341/0US	G2134F1/0US
G21	-	2/0	G21582/0US	G2158F2/0US	G21342/0US	G2134F2/0US
G21	-	4/0	G21584/0US	G2158F4/0US	G21344/0US	G2134F4/0US
G31	#6, #8	#8	G31588US	G3158F8US	G31348US	G3134F8US
G31	#3, #4	#4, #6	G31584US	G3158F4US	G31344US	G3134F4US
G31	#1, #2	#2, #3	G31582US	G3158F2US	G31342US	G3134F2US
G31	2/0, 1/0	1/0, #1	G31581/0US*	G3158F1/0US*	G31341/0US*	G3134F1/0US*
G41	#6, #8	#8	G41588US	G4158F8US	G41348US	G4134F8US
G41	#3, #4	#4, #6	G41584US	G4158F4US	G41344US	G4134F4US
G41	#1, #2	#2, #3	G41582US	G4158F2US	G41342US	G4134F2US

NOTES:
- Disposable single use ceramic mold provides convenience and ease of use.
- Packaged 12 per box.
- No frames or handle clamps are required.
- DRONE required to make UltraShot Uni-Shot connection. See page 250.

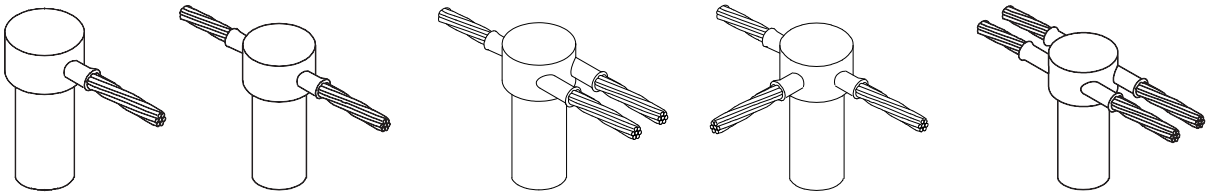


Use locking pliers to support mold

UltraShot (Drop-in)



Uni-Shots - NuwTube



G11 **G21** **G31** **G31*** **G41**

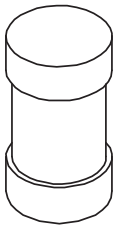
Type	Cable Sizes		Ground Rod			
	Solid	Stranded	5/8 Copper Bonded	5/8 Full	3/4 Copper Bonded	3/4 Full
G11	#6, #8	#8	G11588NU	G1158F8NU	G11348NU	G1134F8NU
G11	#3, #4	#4, #6	G11584NU	G1158F4NU	G11344NU	G1134F4NU
G11	#1, #2	#2, #3	G11582NU	G1158F2NU	G11342NU	G1134F2NU
G11	2/0, 1/0	1/0, #1	G11581/0NU	G1158F1/0NU	G11341/0NU	G1134F1/0NU
G11	-	2/0	G11582/0NU	G1158F2/0NU	G11342/0NU	G1134F2/0NU
G11	-	4/0	G11584/0NU	G1158F4/0NU	G11344/0NU	G1134F4/0NU
G21	#6, #8	#8	G21588NU	G2158F8NU	G21348NU	G2134F8NU
G21	#3, #4	#4, #6	G21584NU	G2158F4NU	G21344NU	G2134F4NU
G21	#1, #2	#2, #3	G21582NU	G2158F2NU	G21342NU	G2134F2NU
G21	2/0, 1/0	1/0, #1	G21581/0NU	G2158F1/0NU	G21341/0NU	G2134F1/0NU
G21	-	2/0	G21582/0NU	G2158F2/0NU	G21342/0NU	G2134F2/0NU
G21	-	4/0	G21584/0NU	G2158F4/0NU	G21344/0NU	G2134F4/0NU
G31	#6, #8	#8	G31588NU	G3158F8NU	G31348NU	G3134F8NU
G31	#3, #4	#4, #6	G31584NU	G3158F4NU	G31344NU	G3134F4NU
G31	#1, #2	#2, #3	G31582NU	G3158F2NU	G31342NU	G3134F2NU
G31	2/0, 1/0	1/0, #1	G31581/0NU*	G3158F1/0NU*	G31341/0NU*	G3134F1/0NU*
G41	#6, #8	#8	G41588NU	G4158F8NU	G41348NU	G4134F8NU
G41	#3, #4	#4, #6	G41584NU	G4158F4NU	G41344NU	G4134F4NU
G41	#1, #2	#2, #3	G41582NU	G4158F2NU	G41342NU	G4134F2NU

NOTES:
- Disposable single use ceramic mold provides convenience and ease of use.
- Packaged 12 per box.
- Requires only a Flint Igniter (FLTIG) to make a connection. See page 304.
- No frames or handle clamps are required.



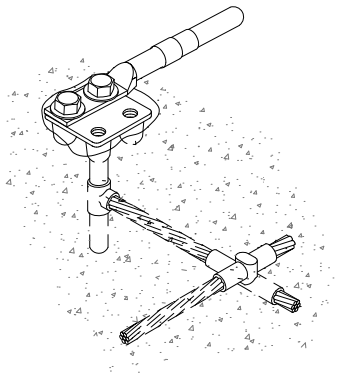
Use locking pliers to support mold

NuwTube (Pour & Shoot)

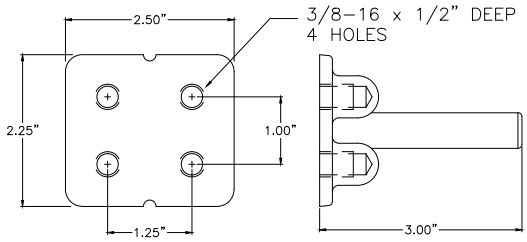


Equipment Ground Plates

APPLICATION NOTE:
Equipment ground plates are cast into concrete structures to offer convenient connection points to the ground system. The cast ground plates are made from copper alloy and are exothermically welded to copper conductors. The resulting connection has an ampacity that surpasses that of the conductor or the stud.

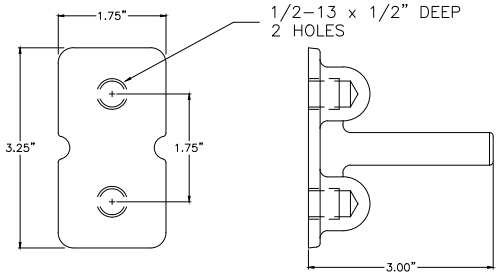


Part No.	Stud Size	Approx. Each Wt. (lbs.)
XGP2.5/2.54/0	4/0 AWG Conc	2
XGP2.5/2.55CM	500 MCM Conc	2



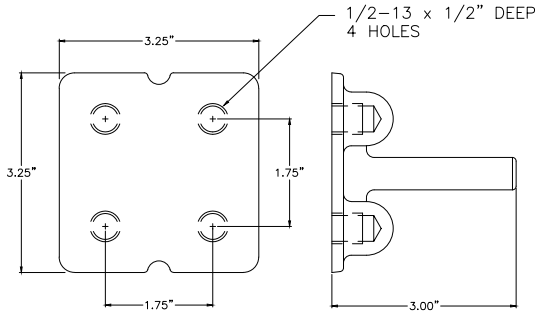
Part No.	Stud Size	Approx. Each Wt. (lbs.)
XGP1.75/3.254/0	4/0 AWG Conc	1.5

- NEMA hole spacing.



Part No.	Stud Size	Approx. Each Wt. (lbs.)
XGP3.25/3.254/0	4/0 AWG Conc	2.5
XGP3.25/3.255CM	500 MCM Conc	2.5

- NEMA hole spacing.



NOTES:
- Use Ultraweld Connection Types that begin with EGP to make connections with ground conductors to equipment ground plates.
- Custom prefabricated weld assemblies available. Contact factory for more information.

Equipment Ground Plate Molds

Mold Information:
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

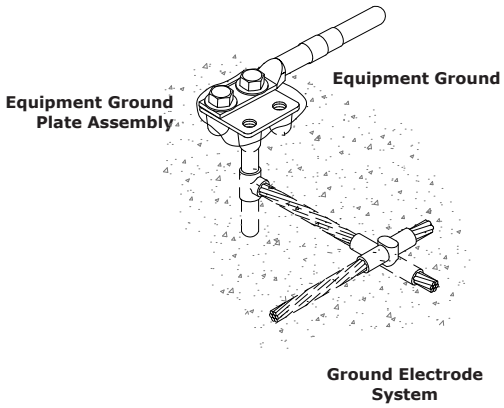
EGPIO 4/0 2/0 B

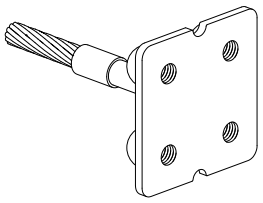
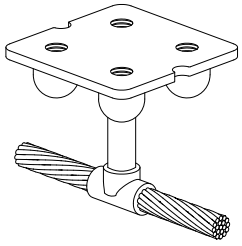
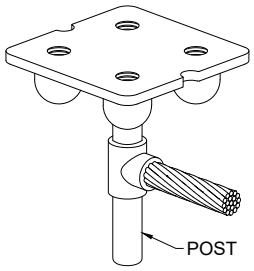
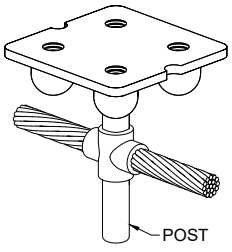
- EGPIO — Style
- 4/0 — Equipment Ground Plate Stud Size
- 2/0 — Cable Size
- B — Price Key

Connection Style	Plate Stud Size	Cable	Mold Part No.	Weld Metal		Required Handle
				UltraShot	NuwTube	
EGPCB	4/0	1/0	EGPCB4/01/0B	US90	NUWTUBE90	MH1
	4/0	2/0	EGPCB4/02/0B	US90	NUWTUBE90	
	4/0	4/0	EGPCB4/04/0B	US90	NUWTUBE90	
EGPCT	4/0	1/0	EGPCT4/01/0B	US115	NUWTUBE115	
	4/0	2/0	EGPCT4/02/0B	US115	NUWTUBE115	
	4/0	4/0	EGPCT4/04/0B	US150	NUWTUBE150	
EGPID	4/0	1/0	EGPID4/01/0B	US150	NUWTUBE150	
	4/0	2/0	EGPID4/02/0B	US150	NUWTUBE150	
	4/0	4/0	EGPID4/04/0B	US150	NUWTUBE150	
EGPIO	4/0	1/0	EGPIO4/01/0B	US150	NUWTUBE150	
	4/0	2/0	EGPIO4/02/0B	US150	NUWTUBE150	
	4/0	4/0	EGPIO4/04/0B	US200	NUWTUBE200	

Recommended Accessories:

CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

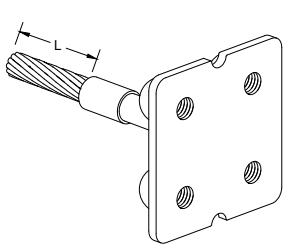
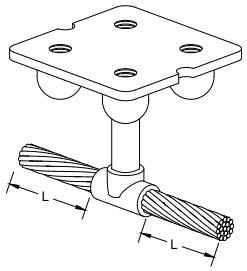
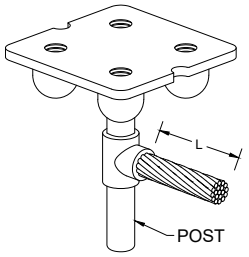
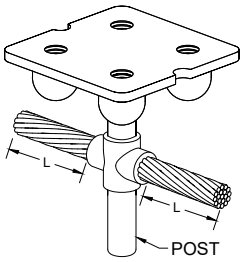


Connection Style	EGPCB	EGPCT	EGPID	EGPIO
Ground Plate Assemblies				

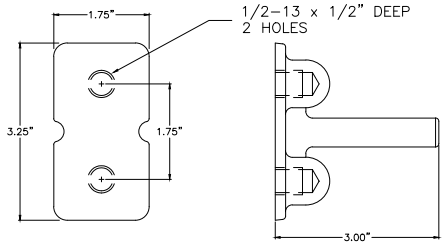
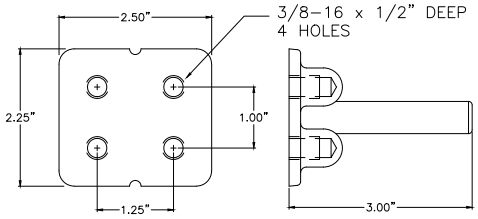
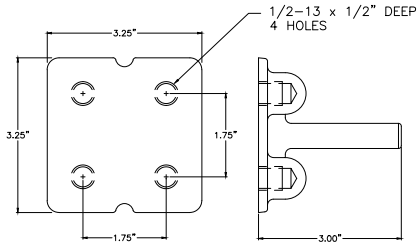
NOTE:
- Style EGPID and EGPIO assemblies have posts formed from the Ultraweld connection that fit into 1/2" pipe that is used for support and positioning the ground plate.

Prefabricated Equipment Ground Plate Assemblies

- The assembly is made to customer specifications per the part numbering system shown below.
- Equipment ground plates are manufactured from cast copper alloy.
- Meets requirements of Federal Specification QQ-B-691B.2 and ASTMB584.
- The copper conductor is factory welded using the Ultraweld process.

BS Style	RT Style	GD Style	GO Style
			

Ground Plate Designation Code:

Ground Plate Code	Ground Plate Part Number	Stud Size	Ground Plate Figure
A	XGP1.75/3.254/0	4/0 AWG Concentric	
B	XGP2.5/2.54/0	4/0 AWG Concentric	
C	XGP2.5/2.55CM	500 MCM Concentric	
D	XGP3.25/3.254/0	4/0 AWG Concentric	
E	XGP3.25/3.255CM	500 MCM Concentric	

Prefabricated Equipment Ground Plate Assemblies

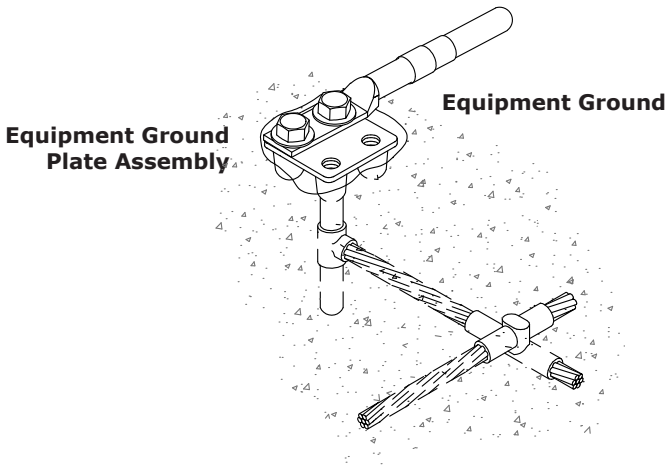
Part Numbering System:

"XGP" + "Style" + "Ground Plate Designation Code" + "Conductor" + "X" + "Conductor Length (in.)"
See Page 296 for type and ground plate designation code.

XGP BS D 1/0 X 24

- XGP → XGP Prefix
- BS → Style
- D → Ground Plate Designation Code
- 1/0 → Conductor
- 24 → Conductor Length (in.)

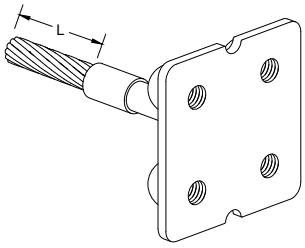
APPLICATION NOTE:
Equipment ground plates are cast into concrete structures to offer convenient connection points to the ground system. The equipment ground plate assemblies provide ease of installation and reduce labor.



Most Common Assemblies

Part No.	Stud Size	Approx. Each Wt. (lbs.)
XGPBSD2/0X12	2/0-19 AWG Concentric	2
XGPBSD1/0X24	1/0-19 AWG Concentric	2

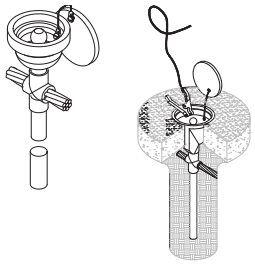
- NEMA hole spacing.



Aircraft Ground Receptacle

Part No.	Approx. Each Wt. (lbs.)
SGRX	1.3

- Ground receptacle designed to be exothermically connected to a ground rod.
- Includes Brass Ball Stud (BBSTUD12).
- Receptacle: top is 3" in diameter, height is 3-1/2".



APPLICATION NOTES:
- Aircraft Ground Receptacles are used when temporary grounds must be established.
- Used for grounding aircrafts during refueling.

Brass Ball Stud

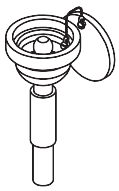
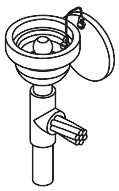
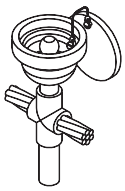
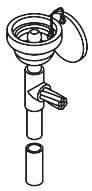
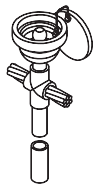
Part No.	Thread Size	Approx. Each Wt. (lbs.)
BBSTUD12	1/2"	0.5



FGRGD 58 2/0 F

- FGRGD — Style
- 58 — Ground Rod Size
- 2/0 — Cable Size
- F — Price Key

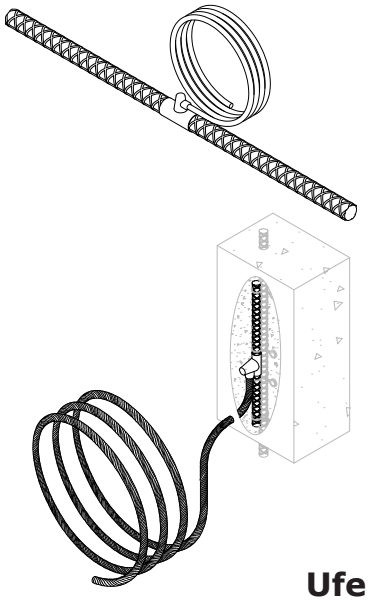
Connection Styles for Aircraft Ground Receptacles

FGRBS	FGRGD	FGRGO	FGRIGD	FGRIGO
				

Connection Style	Ground Rod Size	Cable Size	Mold Part No.	Weld Metal		Required Handle
				UltraShot	NuwTube	
FGRBS	5/8" Copper Bonded 3/4" Copper Bonded	N/A	FGRBS58K FGRBS34K	US300 US300	(2) NUWTUBE150 (2) NUWTUBE150	MH1
FGRGD	5/8" Copper Bonded	1/0 2/0 3/0 4/0	FGRGD581/0F FGRGD582/0F FGRGD583/0F FGRGD584/0F	US400 US400 US400 US400	(2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200	MH2
	3/4" Copper Bonded	1/0 2/0 3/0 4/0	FGRGD341/0F FGRGD342/0F FGRGD343/0F FGRGD344/0F	US400 US400 US400 US400	(2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200	MH2
FGRGO	5/8" Copper Bonded	1/0 2/0 3/0 4/0	FGRGO581/0F FGRGO582/0F FGRGO583/0F FGRGO584/0F	US400 US400 US400 US400	(2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200	MH2
	3/4" Copper Bonded	1/0 2/0 3/0 4/0	FGRGO341/0F FGRGO342/0F FGRGO343/0F FGRGO344/0F	US400 US400 US400 US400	(2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200 (2) NUWTUBE200	MH2

NOTE:
- Style FGRIGD and FGRIGO assemblies have posts formed from the Ultraweld connection that fit into 1/2" pipe that is used for support and positioning the ground plate.
- Custom prefabricated assemblies available. Contact factory for more information.

Ufer Ground Assemblies



Part No.	Reinforcing Steel Size	Conductor Type	Conductor Length (ft.)	Class	Approx. Each Wt. (lbs.)
RB3GA8SX5	3	8 Sol.	5	N/A	1
RB4GA32X5	4	32	5	I	3
RB5GA2TX5	5	2T	5	N/A	2.5
RB5GA28X10	5	28	10	II	6.5
RB6GA4/0X15	6	4/0	15	N/A	12.9

- Prefabricated reinforcing steel ground assembly.
- Standard 24" long reinforcing steel.
- Exothermically welded connection.
- Can be wire tied or welded to reinforcing steel cage prior to concrete pour.
- Conductor can be stubbed out for connection to a downlead or ground grid.
- Other sizes available. Contact factory for more information.

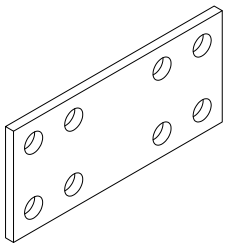
Ufer Ground Assemblies Numbering System

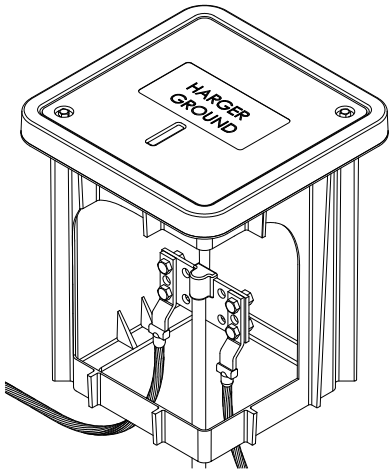
RB5GA 28 X 10

- RB5GA: Reinforcing Steel Size
- 28: Conductor Type
- X
- 10: Length of Conductor (ft.)

Ground Access Ground Bar

GB1436.5GRDCB



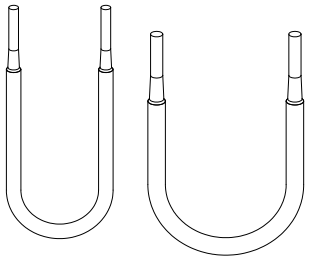


- Provides disconnecting means to grounding system.
- 1/4" x 3" x 6-1/2" electrolytic tough pitch copper alloy 110 bar.
- Accommodates "D" spaced two hole lugs (9/16" punched holes, 1-3/4" on center).
- Use GVSS style mold to exothermically weld ground rod to bar.
  - GVSS58142B for 5/8" copper-bonded ground rod, 250 weld metal.
  - GVSS34142B for 3/4" copper-bonded ground rod, 250 weld metal.
- Use JXL or OXL exothermic lugs (See pages 279-281).
- Approximate we-ight is 2 (1.57) pounds.

Flexible Gate Jumpers

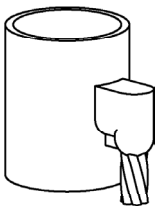
Part No.	Jumper Size	Conductor Size (AWG)	Approx. Each Wt. (lbs.)
GJX2S24	#2 AWG	#2 solid	0.5
GJX2/024	2/0 AWG	2/0 concentric	1
GJX4/024	4/0 AWG	4/0 concentric	1.5

- Can be used with the universal pipe clamps or can be exothermically welded to the fence/ gate post themselves.
- Three sizes designed to fit either a #2 solid, 2/0 stranded or 4/0 stranded exothermic mold.
- Flex jumpers made from welding cable.
- Standard length is 24" long.
- Other lengths available. Please contact factory for more information.



Mold Information:
- Vertical Downward Cable to Side of Fence Post
- Molds listed are for stranded cable. For solid conductor, add suffix "S" after conductor number: 2S = 2 AWG solid conductor.

VDRFP



c UL us Listed 467
#6 through 250 MCM

VDRFP Fence Post Connection

Mold Part No.	Cable Size	Nominal Fence Post Size	Weld Metal		Required Handle
			UltraShot	NuwTube	
VDRFP2SB	#2 Sol	1-1/4" to 4" Post	US65	NUWTUBE65	MH1
VDRFP2B	#2	1-1/4" to 4" Post	US65	NUWTUBE65	
VDRFP1/0B	1/0	1-1/4" to 4" Post	US90	NUWTUBE90	
VDRFP2/0B	2/0	1-1/4" to 4" Post	US90	NUWTUBE90	
VDRFP4/0B	4/0	1-1/4" to 4" Post	US115	NUWTUBE115	

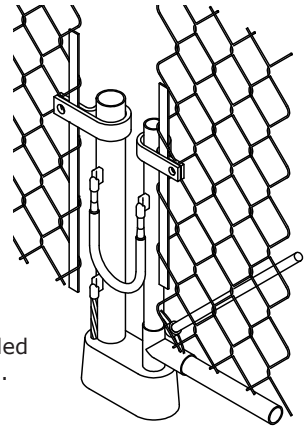
VDRFP 2S B

- VDRFP — Style
- 2S — Cable Size
- B — Price Key

Recommended Accessories:

CSKIT - Chain Support Kit
CCBRSH1 - Cable Cleaning Brush
MCBRSH1 - Mold Cleaning Brush

VDRFP to Fence Post Instructions



Gate Jumper welded directly to posts.

NOTE:
- Thin walled pipe may be unsuitable for exothermic connections. If experiencing burn through issues with the pipe (typically with 2/0 or 4/0 conductors), adding sand inside the fence post well past the exothermic connection may solve this problem. Another solution would be to use a smaller conductor such as a #2 AWG jumper which uses a smaller size weld metal. Lastly, a mechanical fence clamp assembly is a viable solution such as the ones found in on page 138.

LOsmoke System

Using Harger's unique mold design and handle clamps, any mold that uses an MH1 or MH2 handle can be used with the LOsmoke System. The USSKIT, which includes a LOsmoke Adapter Clamp, Filter Housing, and 10 Disposable Filters is all that is required. There are three different USSKIT sizes, the selection of which is driven by the weld metal size and mold price key for the desired application.

- The use of LOsmoke requires the UltraShot electronic ignition system.
- LOsmoke Filters must be replaced after every connection to ensure optimal system performance.





Part No.	Approx. Each Wt. (lbs.)
DRONE	1



LOsmoke Adapter Clamp

Part No.	Approx. Each Wt. (lbs.)
USSXADPTR	4



Milwaukee M18 REDLITHIUM Battery

Part No.	Approx. Each Wt. (lbs.)
MIL1820BAT	1.5



LOsmoke Kit

Kit Part No.	Fits Mold Price Key	Weld Metal Size	Kit Approx. Each Wt. (lbs.)
USSKIT1	B, E, K, I, P, Q	25 - 115	6
USSKIT2	B, E, K, I, P, Q	150 - 300	6
USSKIT3	C, D, F, G, J, Y, Z	150 - 400	6

Kit Includes:
(1) Adapter Clamp (USSXADPTR)
(1) Filter Housing
(10) Filters



Filter

Filter Part No.	Filter Approx. Pack Wt. (lbs.)
USSXFLR1.8	0.05
USSXFLR2	0.05
USSXFLR3	0.05

- Filters sold as 10 pack.



Filter Housing

Filter Housing Part. No.	Filter Housing Approx. Each Wt. (lbs.)
SAFHB25115	0.5
SAFHB150300	0.5
SAFHC400	0.8

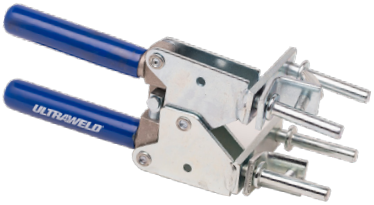
Materials, Tools & Accessories

Mold Handles

Part No.	Application	Approx. Each Wt. (lbs.)
MH1	For molds with B, E, K, P & Q mold price key (3" thick)	2.8
MH2	For molds with C, D, F, Y & Z mold price key (4" thick)	3.5
MH3	For molds with L, M & N mold price key (2" thick)	0.3
MH4	For molds with MX & R mold price key (uncommon)*	1.5
MH6	For molds with I mold price key (3-piece)	4.8
MH7	For molds with J mold price key (3-piece)	5

- Mold Handle Clamps are required for all molds that are not "A" price key.
- Some molds require a mold handle clamp even if a specialized frame is included with mold purchase.
- Handle clamps have a Zinc plated finish.
- MH3 mini mold handle clamps are included with the purchase whose price key are "L", "M", and "N".

* Not compatible with GS Connection Type.



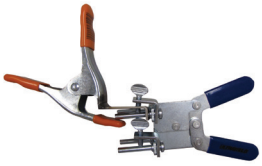
MH1, MH2



MH6, MH7



MH3

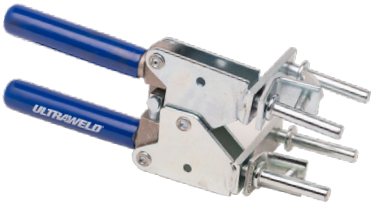


MH4

Mold Handle Kits

Part No.	Fits Mold Price Key	Kit Includes	Approx. Each Wt. (lbs.)
ULTRAMH1KIT	B, E, K	MH1, CSKIT, MSKIT	7
ULTRAMH2KIT	C, D, F	MH2, CSKIT, MSKIT	7.5

- Chain Support Handle Clamp securely holds mold to a vertical pipe or reinforcing steel.
- Magnetic Support Handle Clamp holds mold securely in place when welding to steel surfaces.



MH1, MH2



CSKIT



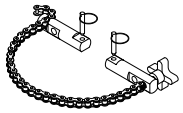
MSKIT

Materials, Tools & Accessories

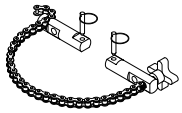
Mold Handle with Chain Support

Part No.	Mold Handle	Fits Mold Price Key	For Following Connection Types	Pipe/ Reinforcing Steel	Approx. Each Wt. (lbs.)
CSH1	MH1 Included	B, E, K	RE7L, VA, VD, VT, VU	Vertical	4
CSH2	MH2 Included	C, D, F	VA, VD, VT, VU	Vertical	4.5
CSKIT	Sold Separately	B, C, D, E, F, K	RE7L, VA, VD, VT, VU	Vertical	2
CSKITHSVM	Sold Separately	B, C	VH, RS	Vertical	3
CSKITHP	Sold Separately	B, C	HRCT6L, HB, HD, HT, HU, RP6L	Horizontal	3.3
CSKITHPVS	Sold Separately	B	HPHCX, RO6L	Horizontal	4

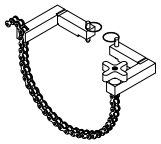
- Chain support handle clamps are used to securely hold the mold to a vertical or horizontal pipe and reinforcing steel.
- A 20" length of chain, which fits up to 4" pipes, comes with the chain support handle clamps.
- For pipes larger than 4" diameter, chain extensions are available. Contact factory for details.



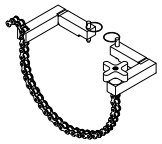
CSKIT



CSKITHSVM



CSKITHP

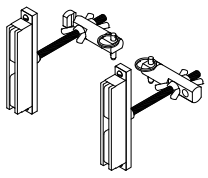


CSKITHPVS

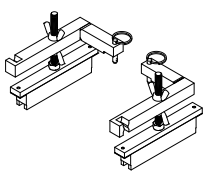
Mold Handle with Magnetic Support

Part No.	Mold Handle	Fits Mold Price Key	Minimum Width Requirements	Approx. Each Wt. (lbs.)
MSHC1	MH1 Included	B, E, K	8"	6
MSHC2	MH2 Included	C, D, F	8"	6.5
MSKIT	Sold Separately	B, C, D, E, F, K	8"	6
MSKITH3	Sold Separately	L, M, N, R	5-1/2"	1
MSKITHSVS	Sold Separately	B, C, D, K	10"	5

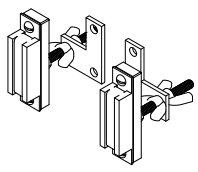
- Magnetic support handle clamps are used to securely hold the mold to a vertical or horizontal flat steel surface.



MSKIT



MSKITHSVS



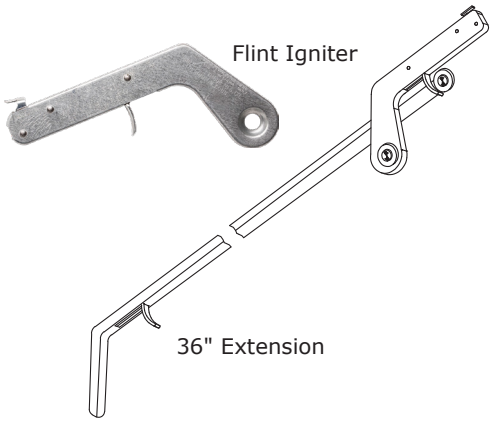
MSKITH3

Materials, Tools & Accessories

Flint Igniters

Part No.	Description	Approx. Each Wt. (lbs.)
FLTIG	Flint Igniter	0.3
FLTIGEXT	36" Extension	1.5
RPLFLT	Replacement Flints	0.1

- When making an Ultraweld connection with NUWTube weld metal, Flint Igniters are used to ignite the starting material.



Torch Head

Part No.	Approx. Each Wt. (lbs.)
TRCHD	1.3

- Self-igniting Torch Head is designed to fit 14 or 16 ounce propane cylinders.
- Torches are required to remove moisture from molds and conductors before making Ultraweld connections.



TRCHD

Hold Down Kit

Part No.	Approx. Each Wt. (lbs.)
UMHDKIT	1.5
UMMHDA	0.5

- UMHDKIT: Attaches to MH1 & MH2 handle clamps for holding mold down when welding to horizontal surfaces.
- UMMHDA: Used with horizontal price key "A" molds.



UMHDKIT



UMMHDA

Mold Stabilization Spike Kit

Part No.	Approx. Each Wt. (lbs.)
MLDSTBLZR	2

- Help stabilize the mold when making cable to cable connections in a trench.
- Attaches to MH1, MH2, MH6, and MH7 mold handles.
- Kit Includes 6" and 12" spike set.

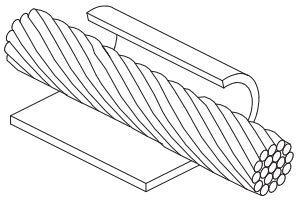


MLDSTBLZR

Materials, Tools & Accessories

Copper Wrap Sleeves





Part No.	Box Qty.	Approx. Box Wt. (lbs.)
WRPSLV	50	0.5

- Wrap Sleeves can be used when welding cables smaller than indicated on mold tag.
- When the cable opening in the mold is larger than the cable, copper Wrap Sleeves are wrapped around the cable until the diameter is about the same size as the mold cable opening.
- Wrap Sleeves are also a required accessory for wrapping around reinforcing steel for certain connection styles to prevent molten weld metal leakage.
- If a CERPM is not required for a reinforcing steel connection then WRPSLV's must be used instead.

Ceramic Reinforcing Steel Packing Material



Part No.	Box Qty.	Approx. Box Wt. (lbs.)
CERPM1	25	0.3
CERPM2	25	0.3
CERPM3	25	0.3

- CERPM's are held against the side of the reinforcing steel to prevent molten weld metal leakage.
- If a WRPSLV is not required for a reinforcing steel connection then a CERPM must be used instead.

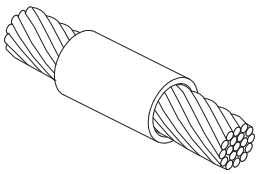
Exothermic Adapter Kit with Case



Part No.	Approx. Box Wt. (lbs.)
EXOADPKIT	10

- Most common adapters and packing material used when required with specific molds.

Adapter Sleeves





Part No.	Cable Size		Use in Mold Size	Sleeve Dimensions			Box Qty.	Approx. Box Wt. (lbs.)
	Concentric Strand	Solid		O.D	I.D.	Length		
ADPSLV6	#12, 14	#10, 12, 14	#6 Sol.	.156	.111	1.00	25	0.3
ADPSLV4	#7, 8, 10	#6, 8	#4 Str.	.227	.177	1.00	25	0.3
ADPSLV2A	#6	#5	#2 Str.	.292	.198	1.00	25	0.3
ADPSLV2B	#4, 5	#3, 4	#2 Str.	.287	.246	1.00	25	0.3
ADPSLV1	#4	n/a	#1 Str.	.340	.246	1.00	25	0.3
ADPSLV1/0	#2	#1	1/0 Str.	.370	.307	1.00	25	0.3
ADPSLV2/0	#1	1/0	2/0 Str.	.420	.359	1.00	25	0.3
ADPSLV3/0	1/0, #1	2/0	3/0 Str.	.452	.389	1.00	25	0.3
ADPSLV4/0	2/0, 1/0	3/0	4/0 Str.	.524	.437	1.50	25	0.3

- Adapter Sleeves can be used when welding cables smaller than indicated on mold tag.
- Adapter Sleeves slide over the cable to adapt smaller size cables to a larger size mold.

Materials, Tools & Accessories

Mold Cleaning Brushes

Part No.	Approx. Each Wt. (lbs.)
MCBRSH1	0.3
MCBRSH2	0.06

- Consistent and proper cleaning of the molds will aid in maintaining or exceeding the average mold life of 50 connections.



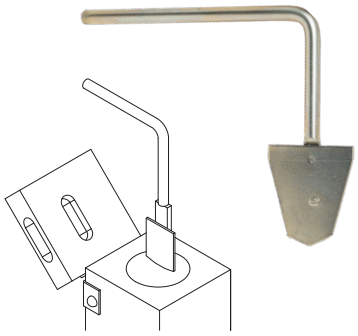
MCBRSH1

MCBRSH2

Mold Cleaning Spades

Part No.	Weld Metal Sizes	Approx. Each Wt. (lbs.)
MCSPD25/115	25 - 115	0.3
MCSPD150/400	150 and larger	0.3

- Primarily used for cleaning slag from horizontally split and unsplit molds.
- Designed to fit the mold crucible for a given range of weld metal sizes.
- Consistent and proper cleaning of the molds will aid in maintaining or exceeding the average mold life of 50 connections.



Cable Cleaning Brush

Part No.	Approx. Each Wt. (lbs.)
CCBRSH1	0.3

- Short, stiff, metal bristles are generally preferred for cleaning concentric conductors and busbars, that are not heavily oxidized.



Cable Cleaning Brush - Heavy Duty

Part No.	Description	Approx. Each Wt. (lbs.)
CCBRSH2	Cable Cleaning Brush	0.8
CCBRSH2R	Replacement Brush Pair	0.3

- Ideal for cleaning concentric stranded cable, especially very dirty or oxidized conductors.



Materials, Tools & Accessories

Mold Carrier

Part No.	Approx. Each Wt. (lbs.)
ULTRAWRAP	2

- Contains an inner and outer E-glass yarn with a padded non-crystalline silicate filling, finished with Kevlar®.
- Extends mold life by protecting against shock impact caused by rough handling.
- Protects exothermic welders from coming into contact with hot molds.



Weld Blanket

Part No.	Approx. Each Wt. (lbs.)
WELDBKT	2

- Used as a protection blanket against weld splatter.



Mold Sealer

Part No.	Approx. Each Wt. (lbs.)
MLDSLR	1

- Used for sealing slightly worn molds to guard against leakage from large stranded conductors.
- Required accessory for some conductor sizes within certain connection types.
- Available in 1 pound package.



Cold Galvanizing Spray

Part No.	Unit Wt. (oz.)
CGS	18.5

- Instant cold galvanizing spray provides protection equal to hot dip galvanizing.
- Used for touching up surfaces affected by welding.



Grinding Wheel

Part No.	Approx. Each Wt. (lbs.)
GRDWL	0.3

- 4-1/2x1/4x7/8 Sigma Max 36



Materials, Tools & Accessories

UltraWeld Mold Box

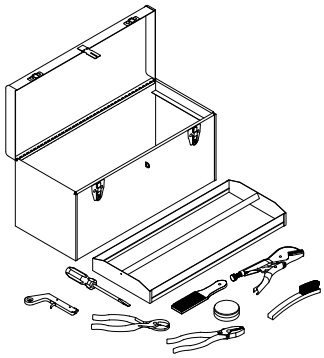
Part No.	Approx. Each Wt. (lbs.)
UWMOLDBOX	13

- Convenient and rugged mold storage.
- 20-1/16" long, 8-7/16" wide 9-7/16" tall.
- 20 gauge electrostatically painted steel box, central lockable clasp.
- Aluminum tray included to store 6 price key "B" molds.

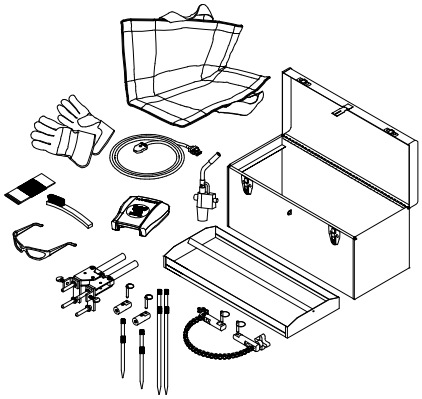


Toolkits

Part No.	Approx. Each Wt. (lbs.)
TOOLKIT	10
USTOOLKIT	23.3



- **TOOLKIT Includes:**
  (1) TOOLBOX: 20-1/16" x 8-7/16" x 9-7/16 metal toolbox with tray
  (1) CC9: 9" Cable Cutters
  (1) LP9: Lineman's Pliers
  (1) SSS6: 6" Screwdriver
  (1) VG10: 10" Locking Pliers
  (1) FLTIG: Flint Igniter
  (1) CCBRSH1: Cable Cleaning Brush
  (1) MCBRSH1: Mold Cleaning Brush
  (1) DISKKIT: Disk Kit



- **USTOOLKIT Includes:**
  (1) DRONE
  (1) TOOLBOX: 20-1/16" x 8-7/16" x 9-7/16 metal toolbox with tray
  (1) MH1: Mold Handle
  (1) CSKIT: Chain Support Kit
  (1) MCBRSH2: Mold Cleaning Brush
  (1) SFTYGLS: Safety Glasses
  (1) GLOVES: Leather Palm Gloves
  (1) 3MABPAD: Abrasive Pad
  (1) ULTRAWRAP: Mold Blanket
  (1) TRCHD: Torch Head
  (1) MLDSTBLZR: Mold Stabilizer Kit

Materials, Tools & Accessories

Toolbox

Part No.	Approx. Each Wt. (lbs.)
TOOLBOX	5.5

- Durable metal toolbox measures 20-1/16" x 8-7/16" x 9-7/16" and includes a tray.



Tools

Part No.	Description
CC9	9" Cable Cutter
LP9	Lineman's Pliers
SSS6	Standard Slot Screwdriver
VG10	Standard Locking Pliers

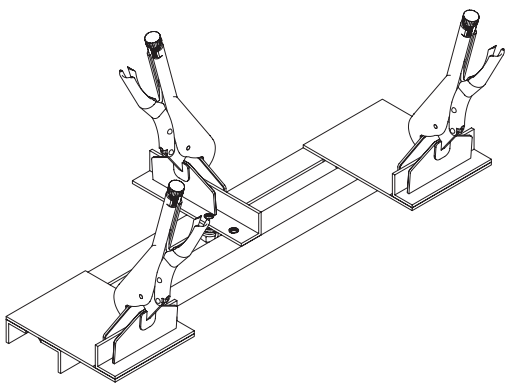
- VG10 is a required tool for most cable to ground rod connections.

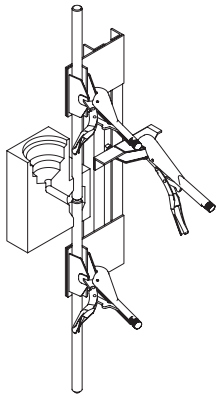


Ground Rod & Cable Clamp

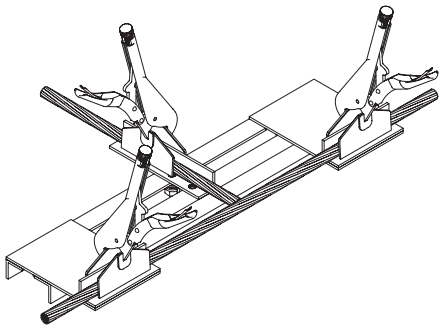
Part No.	Approx. Each Wt. (lbs.)
GRCC	18

- Clamp properly aligns and supports Ground Rods for welding type GG connections. See page 267 for details.
- Add-on third clamp (included) is used to convert into a Cable Clamping system. Thus preventing cables under tension from moving during welding and ensuring no weld metal leakage. This ensures quality connections and increases the life of the mold.





Ground Rod Clamping



Cable Clamping

Technical Information

Conductor Identification

Bare Class A, B, and C Concentric Stranded Conductors

Based on A.S.T.M Standard Specifications

Size in Circular mils	Size AWG	Conductor Diameter	Number of Wires - Strand Diameter					Cable Code
			7	19	37	61	91	
1,000,000	1000	1.152"			.1644*	.1280	.1048	1MM
800,000	800	1.031"			.1470*	.1145	.0938	8CM
750,000	750	.998"			.1424*	.1109	.0908	75CM
700,000	700	.964"			.1375*	.1071	.0877	7CM
600,000	600	.893"			.1273	.0992	.0812	6CM
500,000	500	.813"		.1622*	.1162	.0905		5CM
400,000	400	.728"		.1451	.1040	.0810		4CM
350,000	350	.681"		.1357	.0973	.0757		35CM
300,000	300	.630"		.1257	.0900	.0701		3CM
250,000	250	.575"		.1147	.0822	.0640		25CM
211,600	4/0	.528"	.1739	.1055	.0756			4/0
167,800	3/0	.470"	.1548	.0940	.0763			3/0
133,100	2/0	.419"	.1379	.0837	.0600			2/0
105,500	1/0	.373"	.1228	.0745	.0534			1/0
83,690	1	.332"	.1093	.0664	.0467			1
66,370	2	.292"	.0974	.0591				2
52,630	3	.260"	.0867	.0526				3
41,740	4	.232"	.0772	.0469				4
26,240	6	.184"	.0612	.0372				6
16,510	8	.146"	.0486	.0295				8
10,380	10	.116"	.0385	.0234				10
6,530	12	.0915"	.0305	.0185				12
4,110	14	.0726"	.0242	.0417				14

* Class AA

Bare Solid Copper Conductors

Based on A.S.T.M Standard Specifications

Size AWG	Cross Sectional Area Circular Mils	Wire Diameter	Cable Code
4/0	211,600	.4600"	4/0S
3/0	167,800	.4096"	3/0S
2/0	133,100	.3648"	2/0S
1/0	105,500	.3249"	1/0S
1	83,690	.2893"	1S
2	66,370	.2576"	2S
3	52,630	.2294"	3S
4	41,740	.2043"	4S
6	26,250	.1620"	6S
8	16,510	.1285"	8S
10	10,380	.1019"	10S
12	6,530	.0808"	12S
14	4,110	.0641"	14S

Conductor Area Conversions

Square Inches x 1273 = MCM
MCM x 7.862 x 10^{-4} = Square Inches

Square Inches x 645.2 = Square Millimeter
Square Millimeter x 1.550 x 10^{-3} = Square Inches

Square Millimeters x 1.9736 = MCM
MCM x 0.5067 = Square Millimeters

1 MCM = 1 kcmil = 1,000 circular mil

Technical Information

Copper-Bonded Steel Conductors

Cable Code	Cable Stranding	Nominal Diameter (in.)	Cross Sectional Area (kcmil)
3/10CW	3/#10 CW	.220	31.15
3/9CW	3/#9 CW	.247	39.28
3/8CW	3/#8 CW	.277	49.53
7/10CW	7/#10 CW	.306	72.68
3/7CW	3/#7 CW	.311	62.45
7/9CW	7/#9 CW	.343	91.65
3/6CW	3/#6 CW	.349	78.75
7/8CW	7/#8 CW	.385	115.60
3/5CW	3/#5 CW	.392	99.31
7/7CW	7/#7 CW	.433	145.70
7/6CW	7/#6 CW	.486	183.80
7/5CW	7/#5 CW	.546	231.63
19/9CW	19/#9 CW	.572	248.70
7/4CW	7/#4 CW	.613	292.20
19/8CW	19/#8 CW	.642	313.70
19/7CW	19/#7 CW	.721	395.60
19/6CW	19/#6 CW	.810	498.60
19/5CW	19/#5 CW	.910	628.70

Steel Pipe Sizes

Standard Weight (Schedule 40) **ASTM A53-B ASME B36.10M**

Nominal Pipe Size (NPS)	True Outside Diameter (O.D.)	Wall Thickness	Mold Code
1/2"	0.840"	0.109"	.5
3/4"	1.050"	0.113"	.75
1"	1.315"	0.133"	1
1-1/4"	1.660"	0.140"	1.25
1-1/2"	1.900"	0.145"	1.5
2"	2.375"	0.154"	2
2-1/2"	2.875"	0.203"	2.5
3"	3.500"	0.216"	3
3-1/2"	4.000"	0.226"	3.5
4"	4.500"	0.237"	4
5"	5.563"	0.258"	5
6"	6.625"	0.280"	6
8"	8.625"	0.322"	8
10"	10.750"	0.365"	10
12"	12.750"	0.406"	12

Technical Information

Ground Rods

Nominal Size	Material	Type	Body Diameter	Thread Size	Ground Rod Code
1/2"	Copper-Bonded Copper-Bonded Steel* Copper-Bonded	Sectional Plain Plain Plain	.504" .504" .504" .475"	9/16" N/A N/A N/A	12S 12F 12F 12
5/8"	Steel* Copper-Bonded Copper-Bonded	Plain Plain Sectional	.625" .56" .56"	N/A N/A 5/8"	58F 58 58S
3/4"	Steel* Copper-Bonded Copper-Bonded	Plain Plain Sectional	.75" .678" .678"	N/A N/A 3/4"	34F 34 34S
1"	Steel* Copper-Bonded Copper-Bonded	Plain Plain Sectional	1.00" .912" .912"	N/A N/A 1"	10F 10 10S

* Stainless steel, galvanized steel, solid copper

Rectangular Copper Busbar

Thickness	Width	Circular Mil Size	Weight Lbs. per Foot	Busbar Code
1/8"	1" 1-1/2" 2"	159,200 238,700 318,300	.484 .726 .969	181 181.5 182
3/16"	1" 2"	238,700 477,500	.727 1.45	3161 3162
1/4"	1" 1-1/2" 2" 3" 4"	318,300 477,500 636,600 954,900 1,273,000	.969 1.45 1.94 2.91 3.88	141 141.5 142 143 144
3/8"	1" 1-1/2" 2" 3" 4"	477,500 716,200 954,900 1,432,000 1,910,000	1.45 2.18 2.91 4.36 5.81	381 381.5 382 383 384
1/2"	2" 3" 4"	1,273,000 1,910,000 2,546,000	3.88 5.81 7.75	122 123 124

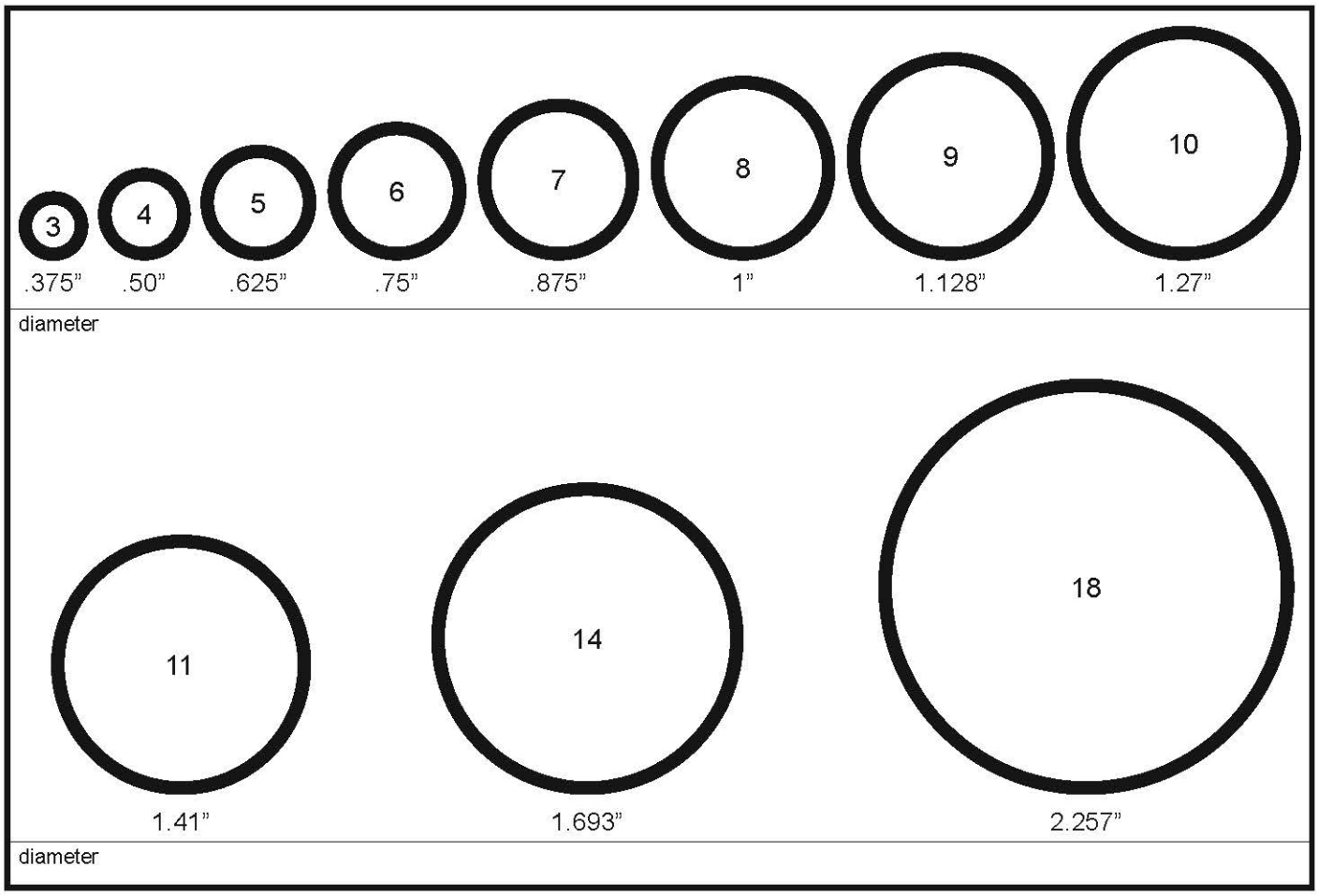
Technical Information

Reinforcing Steel

Size	Nominal Dimensions		Equivalent Copper Size*	Reinforcing Steel Code
	Diameter Inches	Cross-sectional Area-Sq. Inches		
3	.375"	.11"	9 AWG	3
4	.50"	.20"	7 AWG	4
5	.625"	.31"	5 AWG	5
6	.75	.44	3 AWG	6
7	.875"	.60"	2 AWG	7
8	1"	.79"	1 AWG	8
9	1.128"	1"	1/0 AWG	9
10	1.27"	1.27"	2/0 AWG	10
11	1.41"	1.56"	3/0 AWG	11
14	1.693"	2.25"	250 MCM	14
18	2.257"	4"	450 MCM	18

* Based on 8% IACS, rounded to the next higher commercial copper size.

Reinforcing Steel Size Chart



Technical Assistance

Harger supports the engineering community with a variety of on-line resources located at **www.harger.com/engineers-corner**.

Here you will find templates for creating specifications for lightning protection and grounding. Drawings of our most popular products are available for download as well.

If you require something beyond what is posted, please contact customer care at **800.842.7437**.

Additional information can be found on **www.harger.com/resource-library**

- Brochures
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