Harger Lightning & Grounding

Master Equipment Catalog

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.

Information changes after the catalog is printed.
For the most up to date information,
please go to our website at
www.harger.com

Our catalog drawings & details are available on our CD version of this catalog. Please contact us to request a Catalog CD.

Mission Statement

Our mission is to provide the ***best*** grounding and lightning protection equipment in the world. We will accomplish this by providing the most accurate engineering designs available and supplying the highest quality materials.

We will strive to offer the ultimate in customer service, making every customer our first priority. We will continue to grow our company in a controlled, responsible and profitable manner. We will create a stable work environment for our team members that fosters creativity, rewards innovation and self-motivation, and promotes a high feeling of self-worth.

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Section 1
Grounding Components

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UL Definitions

96: UL standard for lightning protection components
50H2: Harger's number for lightning protection (assigned by UL)

467: UL standard for grounding components. Includes requirements for direct burial.
2S01: Harger's number for grounding (assigned by UL)

468: UL listing for lugs
ZMVV: Harger's listing for lugs (assigned by UL)

Section 1.1

Ground Conductors

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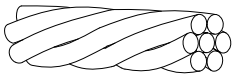
Stranded Copper Conductors

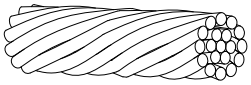
Concentric Lay Soft-Drawn Bare Copper

Part No.	Size (AWG)	No. of Strands	CM Area	Approx. Wt. lbs./M ft.
8-7	8	7	16,510	51
6-7	6	7	26,240	81
4-7	4	7	41,740	127
2-7	2	7	66,360	204
1/0-19	1/0	19	105,600	325
2/0-7	2/0	7	133,100	410
2/0-19	2/0	19	133,100	410
3/0-19	3/0	19	167,800	518
4/0-7	4/0	7	211,600	653
4/0-19	4/0	19	211,600	653

• Contact factory for reel sizes/put ups.



7 Strand Concentric

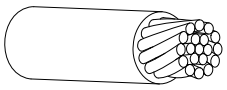


19 Strand Concentric

Green Insulated Conductors

Part No.	Size (AWG)	No. of Strands	Jacket Type	CM Area	Approx. Wt. lbs./M ft.
67G	6	7	THW	26,240	105
6-19G	6	19	THHN	26,240	98
47G	4	7	THW	41,740	160
4-19G	4	19	THHN	41,740	157
27G	2	7	THW	66,360	245
2-19G	2	19	THHN	66,360	240
1/019G	1/0	19	THHN	105,600	372
2/019G	2/0	19	THHN	133,100	462
4/019G	4/0	19	THHN	211,600	716

• Contact factory for reel sizes/put ups.

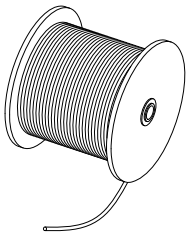


19 Strand Insulated

NOTES:
- Green Insulated conductor carries a THW or THHN rating. Other colors available upon request.
- Sizes up to 1000 MCM are available. Please contact the factory for special requests.
- Harger offers standard reel sizes, however we will cut to specified lengths.
- Bare Stranded conductor shall meet the requirements of ASTM B-8.
- Stranded copper conductors available tinned. Please add suffix T to part number.

Solid Copper Conductors

Solid Single Soft-Drawn Bare Copper

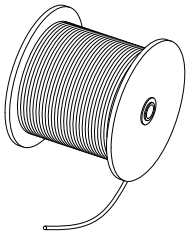


Part No.	Size (AWG)	Diameter	CM Area	Approx. Wt. lbs./M ft.
10	10	.101	10,380	31-1/2
8	8	.128	16,510	50
6	6	.162	26,240	80
4	4	.204	41,470	126
2	2	.257	66,360	201

• Contact factory for reel sizes/put ups.

Solid Tinned Copper Conductors

Solid Single Soft-Drawn Bare Tinned Copper



Part No.	Size (AWG)	Diameter	CM Area	Approx. Wt. lbs./M ft.
8T	8	.128	16,510	50
6T	6	.162	26,240	80
4T	4	.204	41,470	126
2T*	2	.257	66,360	201

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

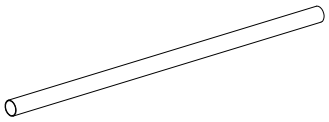
• Contact factory for reel sizes/put ups.

NOTES:

- Other sizes are available. Please contact factory for special requests.
- Solid soft-drawn conductors shall meet the requirements of ASTM B-3.
- Tinned Copper conductors shall meet the requirements of ASTM B-33.

Solid Copperweld Conductors

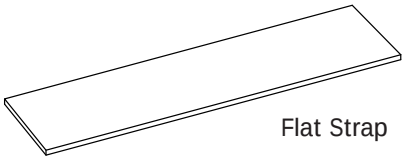
#6 Solid Copperweld LC 30% Dead Soft Annealed



Part No.	Size (AWG)	Diameter	CM Area	Approx. Wt. lbs./M ft.
6CW3D	6	.162	26,240	80

• Contact factory for reel sizes/put ups.

Copper Flat Strap Conductors



Flat Strap

Part No.	Width (Inches)	Thickness (Inches)	Actual Gauge	X-Sectional Area (in.²)	Approx. Wt. lbs./M ft.
CUFS58064	.625	.064	14	.0400	154
CUFS1032	1	.032	20	.0320	124
CUFS1516	1.5	.016	26	.0239	93
CUFS15032	1.5	.032	20	.0480	185-1/2
CUFS2016	2	.016	26	.0318	123-1/2
CUFS2032	2	.032	20	.0640	247-1/2
CUFS2064	2	.064	14	.1280	495
CUFS3016	3	.016	26	.0478	186
CUFS3032	3	.032	20	.0960	371
CUFS4016	4	.016	26	.0640	247-1/2
CUFS6016	6	.016	26	.0956	372

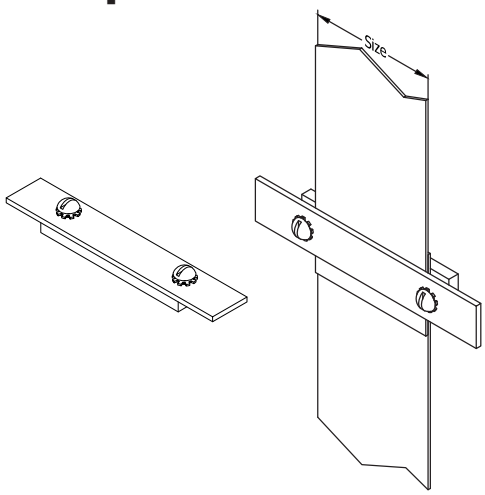
• Contact factory for reel sizes/put ups.

NOTES:
- Most Bare Copper Flat Strap conductors are available tinned. Please add suffix T to part number.
- Other sizes of conductors are available. Please contact factory for more information.

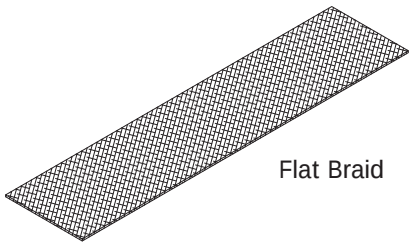
Copper Flat Strap Clamps

Part No.	Strap Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
FSC2	2"	1/2	10	5
FSC3	3"	3/4	10	7-1/2
FSC4	4"	1	10	10
FSC6	6"	1-1/4	10	12-1/2

- 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.



Tinned Copper Flat Braid Conductors



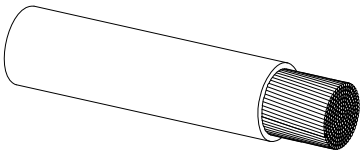
Flat Braid

Part No.	Width (Inches)	Thickness (Inches)	Actual Gauge	Nominal Circ. Mils	Approx. lbs./M ft.
CUFB14030	.25	.030	14	4,200	16
CUFB12094	.50	.094	6	24,120	84
CUFB58062	.625	.062	4	36,000	121
CUFB34062	.75	.062	6	24,120	85
CUFB1062	1	.062	4	38,592	135
CUFB15125	1.5	.125	2/0	120,600	420

- Contact factory for reel sizes/put ups.

NOTES:
- Width and thickness on flat braid items are nominal size (not exact).
- Other sizes of conductors are available. Please contact factory for more information.

Black Insulated Welding Cable



Part No.	Size (AWG)	Voltage Rating	Approx. lbs./M ft.
2WC	2	600V	302
2/0WC	2/0	600V	578
4/0WC	4/0	600V	858

• Contact factory for reel sizes/put ups.

NOTES:
- Rope stranded copper conductor, vinyl separator, insulated with oil and water resistant thermoplastic rubber compound (TPE).
- For connections for electrode holder and grounding clamp to arc welder, bus, welding box or transformer.
- Also suitable for certain 600-volt applications such as battery leads and jumper cables.

Section 1.2

Ground Electrodes & Accessories

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Copper Clad 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'	6	5	30	Yes	Yes
1210	1/2" x 10'	7	5	35	Yes	No
588	5/8" x 8'	7	5	35	Yes	No
588RUS	5/8" x 8'	7	5	35	Yes	No
588UPC	5/8" x 8'	7	5	35	Yes	Yes
5810	5/8" x 10'	9	5	45	Yes	No
5810UPC	5/8" x 10'	9	5	45	Yes	Yes
348	3/4" x 8'	11	5	55	Yes	No
3410	3/4" x 10'	13	5	65	Yes	No
3412	3/4" x 12'	15	5	75	Yes	No
110	1" x 10'	23	3	69	Yes	No

• For more information refer to Ground Rod table on page 335.

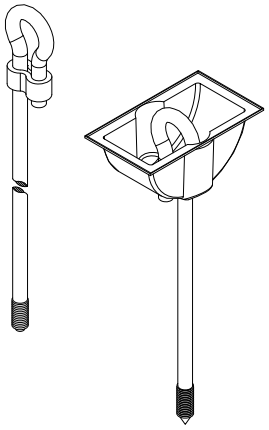
Listed 467

TECHNICAL NOTES:

- **NEC 2011 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 6.9.2.3 (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 6.9.2.6 (Summarized)**
  The copper jacket shall not be less than .010" thick at any point.
- **RUS** (Rural Utilities Service) ground rods have a 13 mil copper plating thickness.

Tie Down Ground Rods

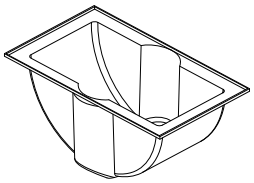
Part No.	Rod Size	Thread Size	Approx. Each Wt. (lbs.)	Standard Bundle	Approx. Wt. lbs./Bundle
3410TD	3/4" x 10'	3/4-10 (1.5" long)	14	5	70
348TD	3/4" x 8'	3/4-10 (1.5" long)	11	5	55
588TD	5/8" x 8'	5/8-11 (1.5" long)	7-1/2	5	37-1/2
586TD	5/8" x 6'	5/8-11 (1.5" long)	6	5	30



- Copper Clad Aircraft Tie Down Ground Rods are manufactured of high strength C1018 cold drawn steel with 0.010" thick copper plating.
- Threads are cold-rolled to provide superior strength.
- Use plastic mold #TDGRDM (sold separately) during installation.
- See page 22 for tool for driving tie down ground rods (34TDDRIVER).

Tie Down Plastic Mold

Part No.	Approx. Each Wt. (lbs.)
TDGRDM	1/4



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'	15	5	75	Yes
3410C	3/4" x 10'	18	5	90	Yes
110C	1" x 10'	31	3	93	Yes

Listed 467

- 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 335.

APPLICATION NOTES:

- Solid copper ground electrodes are used when better conductivity and corrosion resistance is preferred.
- Due to softness of solid copper, care must be taken when driving electrode.

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'	11	5	55	Yes
3410SS3	3/4" x 10'	15	5	75	Yes

Listed 467

- All rods are full diameter.
- Made from Solid 304 Stainless Steel.
- For more information refer to Ground Rod table on page 335.

TECHNICAL NOTES:

- **UL 467 6.9.2.3 (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 6.9.2.5 (Summarized)**
  The stainless steel jacket mentioned in 9.2.3 shall not be less than .015 inches thick at any point.
- **UL 467 6.9.2.8 (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	40	No
588GUPC	5/8" x 8'	8	5	40	Yes
5810G	5/8" x 10'	10	5	50	No
5810GUPC	5/8" x 10'	10	5	50	Yes
348G	3/4" x 8'	12	5	60	No
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'	6	5	30	No
128GUPC	1/2" x 8'	6	5	30	Yes

- All rods are full diameter.
- For more information refer to Ground Rod table on page 335.

NOTES:

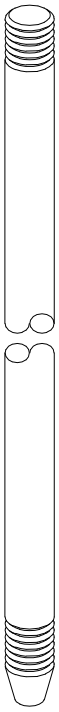
- Manufactured from zinc coated high strength steel.
- Meets requirements of NEMA GR-1.
- Preferred electrode when primary concern is cathodic protection to structure.
- Non UL listed.

Sectional Ground Rods

Sectional Copper Clad 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	10	No
S583	5/8" x 3'	3	5	15	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'	11	5	55	Yes
S3410	3/4" x 10'	13	5	65	Yes
S110	1" x 10'	23	3	69	Yes

• All rods are full diameter.
• For more information refer to Ground Rod table on page 335.



Listed 467

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'	6	5	30	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

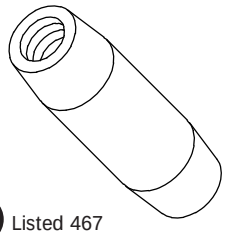
• All rods are full diameter.
• Made from Solid 304 Stainless Steel.

Sectional Stainless Steel Ground Rods Notes:
SS-3 = Type 304 Stainless Steel - Non-ferrous UL listed.
Other sizes available.
Contact factory for details.

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

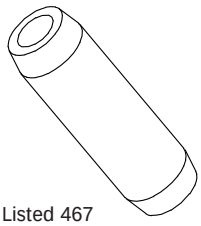
Part No.	Ground Rod Size	Material	Box Qty.	Approx. Box Wt. (lbs.)
GRC12	1/2"	Bronze	5	2-1/2
GRC12SS	1/2"	Stainless Steel	5	2-1/2
GRC58	5/8"	Bronze	5	2-1/2
GRC58SS	5/8"	Stainless Steel	5	2-1/2
GRC34	3/4"	Bronze	5	2-1/2
GRC34SS	3/4"	Stainless Steel	5	2-1/2
GRC1	1"	Bronze	5	5
GRC1SS	1"	Stainless Steel	5	5



Listed 467

- Corrosion resistant silicon bronze threaded ground rod coupler for sectional ground rods.
- Also available in stainless steel. Stainless steel couplers are not UL Listed.

Part No.	Ground Rod Size	Box Qty.	Approx. Box Wt. (lbs.)
GRCC58	5/8"	5	2-1/2
GRCC34	3/4"	5	2-1/2



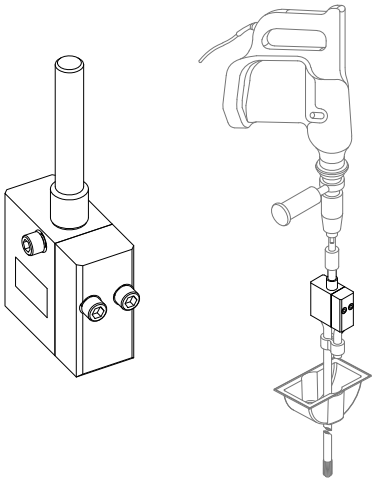
Listed 467

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

Tie Down Ground Rod Driver

Part No.	Description	Qty.	Approx. Each Wt. (lbs.)
34TDDRIVER	3/4" Ground Rod Driver	EA	11

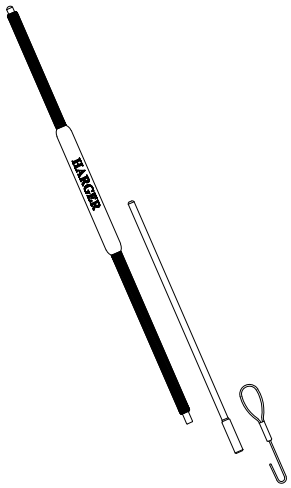
- For driving 3/4" tie down ground rods, #3410TD (see page 19), without deforming the eye loop.
- Manufactured from tool hardened shock resistant steel.
- 3-piece design allows operator to remove tool in case of a jam.
- Driving hammer and 3/4" ground rod drive bit not included.



Ground Rod Driver

Part No.	Description	Ground Rod Size	Qty.	Approx. Each Wt. (lbs.)
GRD58	Driver & 5/8" Insert	1/2" & 5/8"	EA	23
GRD34I	Replacement Insert	3/4"	EA	6

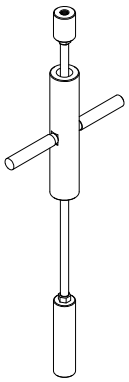
- Drives ground rods from ground level without the need for a ladder or sledge hammer.
- 3/4" insert is interchangeable with driver body.
- Insert prevents driver from slipping off ground rod near ground level.
- Insert prevents "mushrooming" top of ground rod.

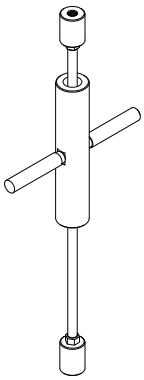


Ground Rod Drivers

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

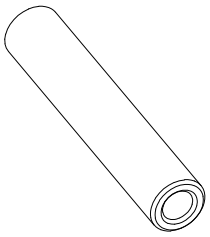

SMGRD58U


SMGRD58USHGR

Drive Sleeves

Part No.	Ground Rod Size	Qty.	Approx. Each Wt. (lbs.)
GRDS58	5/8"	EA	2
GRDS34	3/4"	EA	3

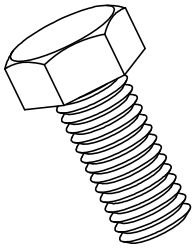
- For Copper Clad Steel ground rods.



- Prevents "mushrooming" top of ground rod while driving rod.

Drive Studs

Part No.	Ground Rod Size	Box Qty.	Approx. Box Wt. (lbs.)
GDS12	1/2"	5	2-1/2
GDS58	5/8"	5	2-1/2
GDS34	3/4"	5	2-1/2
GDS1	1"	3	3

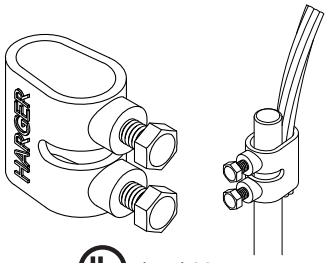


- High strength alloy driving stud prevents damage to the coupler or ground rod threads when driving ground rods.

Ground Rod Clamps

Universal Ground Rod Clamp - Heavy Duty

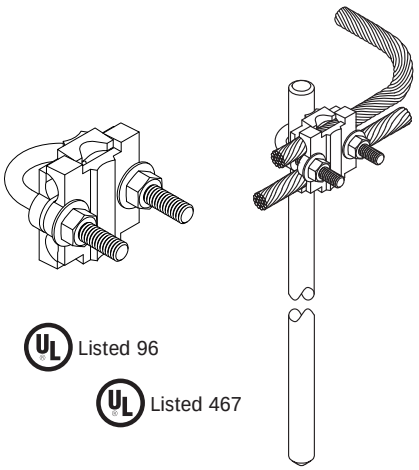
Part No.	Ground Rod Size	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
302U	1/2"	#6 Sol. - 350 MCM	5	5
	5/8"	#6 Sol. - 350 MCM		
	3/4"	#2 Sol. - 250 MCM		



UL Listed 96

- Heavy duty bronze ground rod clamps.
- 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.

Part No.	Ground Rod Size	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
305	Up thru 1"	#6 - 500 MCM	5	3



UL Listed 96

UL Listed 467

- 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.

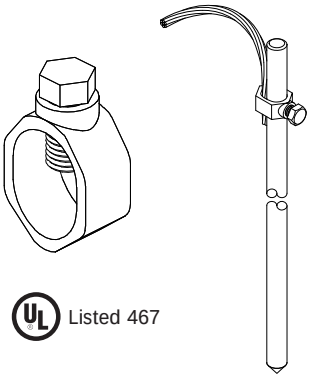
APPLICATION NOTES:

- Ground Rod Clamps for lightning protection systems require 1-1/2" of surface contact between conductor and ground rod.

Ground Rod Clamps

Part No.	Ground Rod Size	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)	UL Mark
300LD	1/2"	10 Sol. - #2 Str.	10	2	Yes
301LD	5/8"	10 Sol. - #2 Str.	10	2	Yes
302LD	3/4"	10 Sol. - #2 Str.	10	2	Yes
303LD	1"	8 Sol. - 4/0	10	6	Yes

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



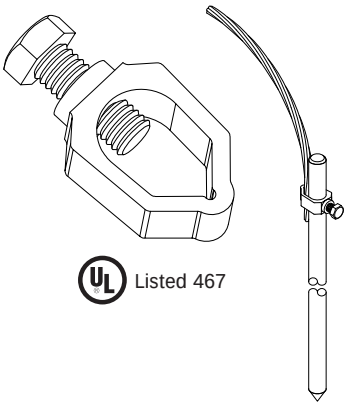
Listed 467

Universal Ground Rod Clamp - Light Duty

Part No.	Ground Rod Size	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)	UL Listed*
302UGRC	3/8"	1/0 - 10 Sol.	10	2	No
	1/2"	1/0 - 10 Sol.	10	2	Yes
	5/8"	1/0 - 10 Sol.	10	2	Yes
	3/4"	1/0 - 8 Sol.	10	2	Yes

- Light duty ground rod clamp for securing cable to ground rod.
- Eliminates the need to inventory assorted different-size clamps.
- Replaces a wide range of products made for economy, standard duty, heavy duty and extra heavy duty applications.
- Made from corrosion resistant silicon bronze.
- Accommodates 3/8" to 3/4" ground rods and #10 Solid to 1/0 Stranded conductor.
- Tested to 300 inch-pounds.

* UL and CSA listed for Direct Burial.



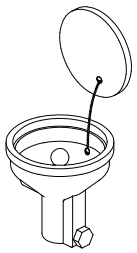
Listed 467

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.

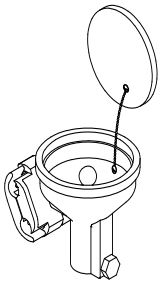
Ground Receptacles

Part No.	Ground Rod Size	Conductor Type	Qty.	Approx. Each Wt. (lbs.)
350-4SS	1/2"	Set Screw	EA	2
350-5SS	5/8"	Set Screw	EA	2
350-6SS	3/4"	Set Screw	EA	2
350-4T	1/2"	Threaded	EA	2
350-5T	5/8"	Threaded	EA	2
350-6T	3/4"	Threaded	EA	2



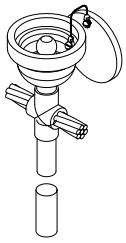
- 350 Series heavy duty bronze floor receptacle features a flush mount cover attached to the main body via a stainless steel ball chain.
- Brass ball stud located inside the receptacle provides the termination point for ground clamps.
- Brass ball stud is removable. Uses 1/2" stud #BBSTUD12.
- Receptacle top is 3" in diameter, height is 3-1/2" tall.

Part No.	Ground Rod Size	Conductor Type	Qty.	Approx. Each Wt. (lbs.)
351-4SS	1/2"	Set Screw	EA	2
351-5SS	5/8"	Set Screw	EA	2
351-6SS	3/4"	Set Screw	EA	2
351-4T	1/2"	Threaded	EA	2
351-5T	5/8"	Threaded	EA	2
351-6T	3/4"	Threaded	EA	2



- Similar to 350 Series except features a bronze dual cable connector.
- Accepts all conductors up to 4/0.
- Brass ball stud is removable. Uses 1/2" stud #BBSTUD12.
- Receptacle top is 3" in diameter, height is 3-1/2" tall.

Part No.	Qty.	Approx. Each Wt. (lbs.)
SGRX	EA	1-1/4



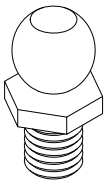
- Ground receptacle designed to be exothermically connected to a ground rod. **See page 320 for mold styles.**
- Brass ball stud is removable. Uses 1/2" stud #BBSTUD12.

APPLICATION NOTES:

- Ground Receptacles are used when temporary grounds must be established.
- Used for grounding aircrafts during refueling.
- 351 Series accept ground loop conductors; important when establishing an equipotential ground plane.

Brass Ball Studs

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

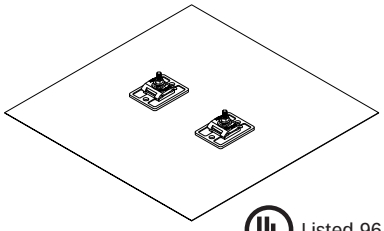


- Used as replacement studs for ground receptacles.
- Can also be mounted on ground bars.
- Brass Ball Stud: 3/4" in diameter, 1-1/2" total length.

Copper Ground Plates

Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
335	18" x 18"	.032	6
336	24" x 24"	.032	9

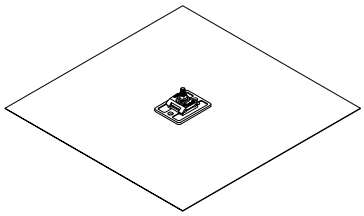
- Copper Ground Plate features two dual cable connectors for a secure electrical connection.



Listed 96

Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
335-1	18" x 18"	.032	5
336-1	24" x 24"	.032	8

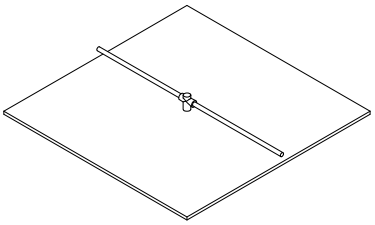
- Same as above except only has a single cable connector.



Listed 96

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP18182T	18" x 18"	2T	4
GP18184/0	18" x 18"	4/0	4-1/2
GP24242T	24" x 24"	2T	6-1/2
GP24244/0	24" x 24"	4/0	7

- Copper Ground Plate features an 18" or 24" (depending on the size of the plate) copper conductor exothermically welded to the plate.
- Thickness is .032 inches.



Other sizes and thicknesses are available. Please contact factory for more information.

TECHNICAL NOTES:

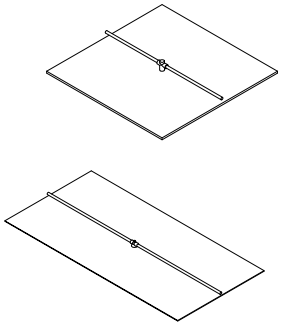
- **NEC 2011 Article 250.52(A)(7) (Summarized)**
  Each plate electrode shall expose not less than 0.186 m^2 (2 ft^2) of surface to exterior soil. Electrodes of non-ferrous metal shall be at least 1.5 mm (0.06 in.) in thickness.
- **NEC 2011 Article 250.53 (A)**
  Rod, Pipe, and Plate Electrodes. Where 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.

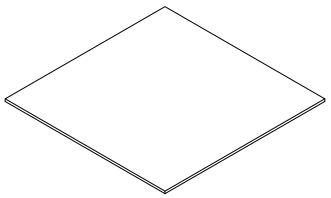
NEC Compliant Copper Ground Plates

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP06212122T	12" x 12"	2T	3-1/2
GP06212124/0	12" x 12"	4/0	3-1/2
GP06212242T	12" x 24"	2T	6-1/2
GP06212244/0	12" x 24"	4/0	7



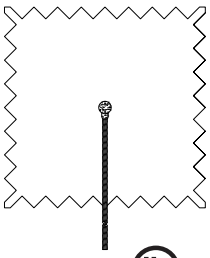
- Copper Ground Plate features a 12" or 24" (depending on the size of the plate) copper conductor exothermically welded to the plate.
- Meets grounding requirements of the National Electrical Code.
- Thickness is .062 inches.

Part No.	Ground Plate Size	Thickness (Inches)	Approx. Each Wt. (lbs.)
GP141818	18" x 18"	.25	27
GP142424N	24" x 24"	.25	47



- 1/4" thick bare copper ground plate.
- Field connection required.
- Meets grounding requirements of the National Electrical Code.

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP142424JDP	24" x 24"	4/0	52-1/2



- 1/4" x 24" x 24" ground plate with zig-zag sheared edges provides 66% more edge surface area than conventional ground plates.
- 5' long 4/0-7 strand tail exothermically welded to center of plate.
- Meets grounding requirements of the National Electrical Code.
- Thickness is .25 inches.

Listed 96

Other sizes and thicknesses are available. Please contact factory for more information.

TECHNICAL NOTES:

- **NEC 2011 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 2011 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:

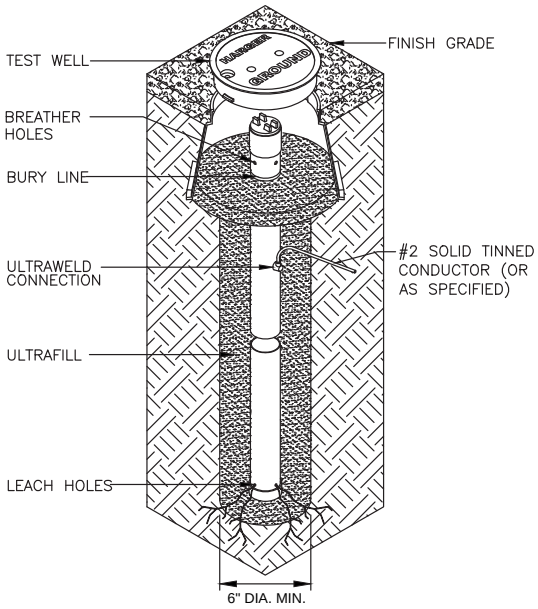
- Copper Ground Plates are used in areas having little or no top soil.
- Can also be used to enhance ground grid systems.
- Can be used in conjunction with earth enhancement material such as Ultrafill.

Enhanced Ground Rods

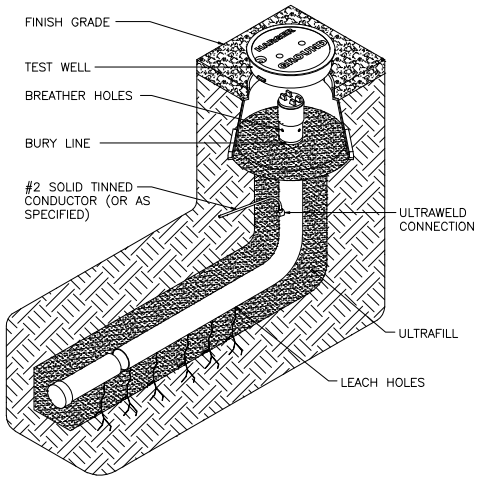
What is an Enhanced Ground Rod?

Simply put, 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.



Vertical



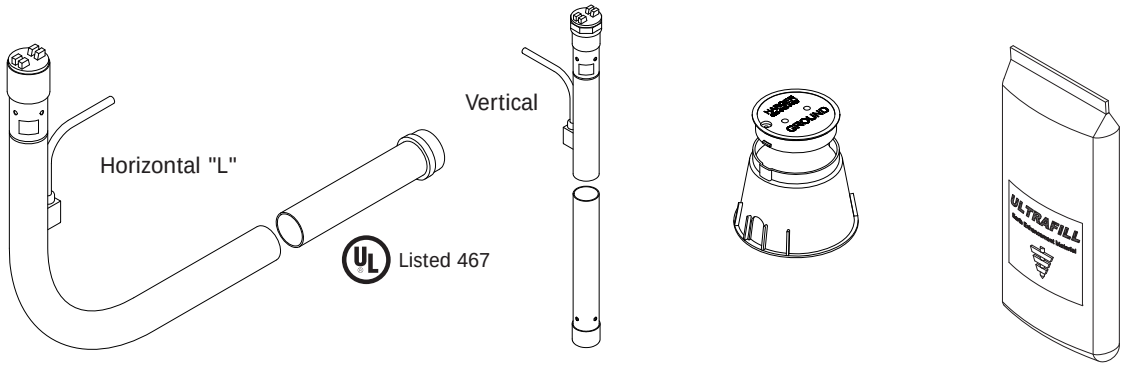
Horizontal

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



EGR SS 10 L W G 2T

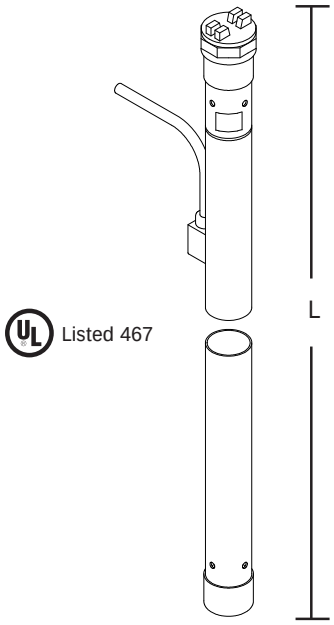
- **EGR** — Enhanced Ground Rod
- **SS** — Material: Copper - Leave Blank; Stainless Steel - Add SS
- **10** — Length (ft.)
- **L** — Style: Vertical - Leave Blank; Horizontal - Add L
- **W** — Inspection Well: Include in Kit - Add W; None Required - Leave Blank
- **G** — Ultrafill Ground Material: Include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

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 2 - 50 pound bags of Ultrafill with a #2 solid tinned 5' tail exothermically welded to the rod. The part number is **EGRSS10LWG2T.**

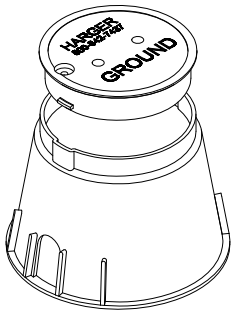
TECHNICAL NOTES:

- **UL 467 6.9.3.1 (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 inches and a wall thickness not less than .080 inch; and
  c) If the means of installation is not obvious, be accompanied by adequate installation instructions.
- **UL 467 6.9.3.2 (Summarized)**
  The chemical charge within the rod electrode described in 9.3.1 shall be a substance that does not cause the electrode to corrode at a faster rate than an electrode constructed of 3/4 inch trade size rigid ferrous metal conduit.
- **UL 467 6.9.3.3 (Summarized)**
  With reference to 9.3.2, a chemical charge of 60 percent sodium chloride and 40 percent calcium chloride may be used if the total weight of the charge is less than 11 pounds.

Copper Vertical Enhanced Ground Rod Kits



Listed 467

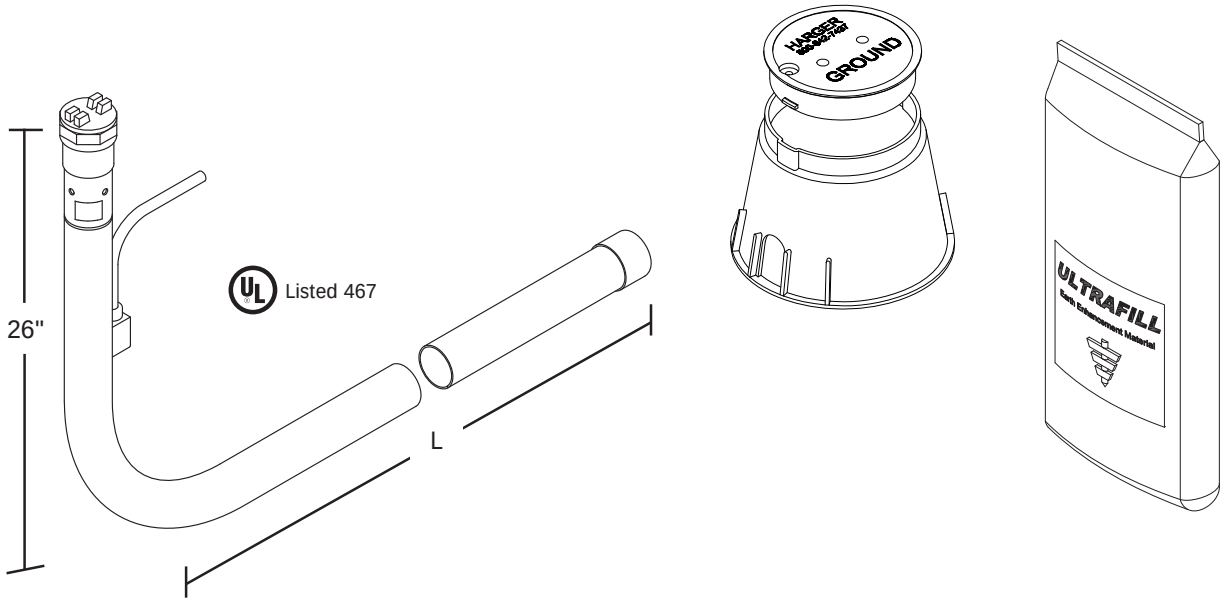


Part No.	Length	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGR5WG4/0*	5'	Yes	1	5' - 4/0 Stranded	80
EGR8WG2T	8'	Yes	2	5' - #2 Solid Tinned	135
EGR8WG2/0	8'	Yes	2	5' - 2/0 Stranded	140
EGR8WG4/0	8'	Yes	2	5' - 4/0 Stranded	145
EGR10WG2T	10'	Yes	2	5' - #2 Solid Tinned	185
EGR10WG2/0	10'	Yes	2	5' - 2/0 Stranded	190
EGR10WG4/0	10'	Yes	2	5' - 4/0 Stranded	195
EGR20WG2T	20'	Yes	4	5' - #2 Solid Tinned	320
EGR20WG2/0	20'	Yes	4	5' - 2/0 Stranded	325
EGR20WG4/0	20'	Yes	4	5' - 4/0 Stranded	330

• Other sizes and conductor types available. Contact the factory for details.
* 5' enhanced ground rods are not UL listed.

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".

Copper Horizontal L-shaped Enhanced Ground Rod Kits

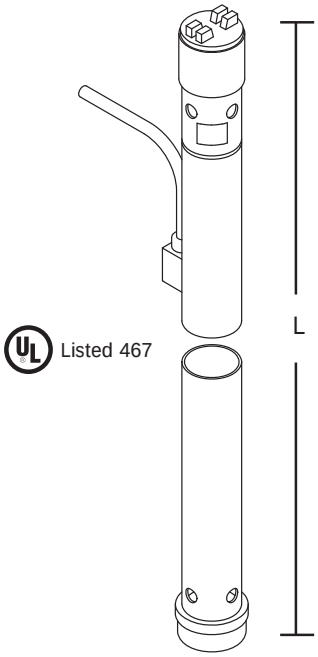


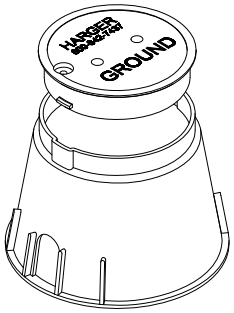
Part No.	Dims H* x L*	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGR8LWG2T	2' x 8'	Yes	2	5' - #2 Solid Tinned	150
EGR8LWG2/0	2' x 8'	Yes	2	5' - 2/0 Stranded	155
EGR8LWG4/0	2' x 8'	Yes	2	5' - 4/0 Stranded	160
EGR10LWG2T	2' x 10'	Yes	2	5' - #2 Solid Tinned	205
EGR10LWG2/0	2' x 10'	Yes	2	5' - 2/0 Stranded	210
EGR10LWG4/0	2' x 10'	Yes	2	5' - 4/0 Stranded	215
EGR20LWG2T	2' x 20'	Yes	4	5' - #2 Solid Tinned	340
EGR20LWG2/0	2' x 20'	Yes	4	5' - 2/0 Stranded	345
EGR20LWG4/0	2' x 20'	Yes	4	5' - 4/0 Stranded	350

• Other sizes and conductor types available. Contact the factory for details.
* 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".

Stainless Steel Vertical Enhanced Ground Rod Kits





Part No.	Length	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS5WG4/0*	5'	Yes	1	5' - 4/0 Stranded	80
EGRSS8WG2T	8'	Yes	2	5' - #2 Solid Tinned	135
EGRSS8WG2/0	8'	Yes	2	5' - 2/0 Stranded	140
EGRSS8WG4/0	8'	Yes	2	5' - 4/0 Stranded	145
EGRSS10WG2T	10'	Yes	2	5' - #2 Solid Tinned	185
EGRSS10WG2/0	10'	Yes	2	5' - 2/0 Stranded	190
EGRSS10WG4/0	10'	Yes	2	5' - 4/0 Stranded	195
EGRSS20WG2T	20'	Yes	4	5' - #2 Solid Tinned	320
EGRSS20WG2/0	20'	Yes	4	5' - 2/0 Stranded	325
EGRSS20WG4/0	20'	Yes	4	5' - 4/0 Stranded	330

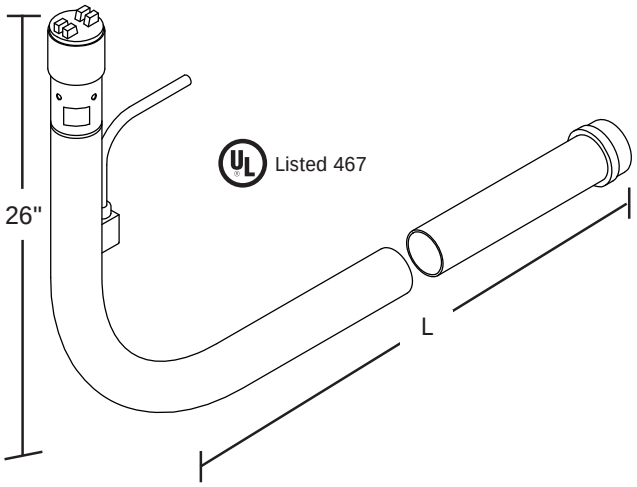
- Manufactured from corrosion resistant 300 series stainless steel.
- Other sizes and conductor types available. Contact the factory for details.

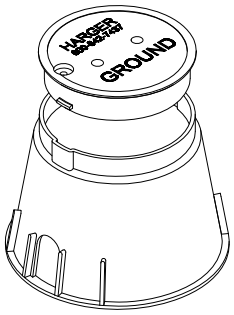
* 5' enhanced ground rods are not UL listed.

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".

Stainless Steel Horizontal L-shaped Enhanced Ground Rod Kits





Part No.	Dims. H* x L*	Inspection Well	Ultrafill 50# Bag	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS8LWG2T	2' x 8'	Yes	2	5' - #2 Solid Tinned	150
EGRSS8LWG2/0	2' x 8'	Yes	2	5' - 2/0 Stranded	155
EGRSS8LWG4/0	2' x 8'	Yes	2	5' - 4/0 Stranded	160
EGRSS10LWG2T	2' x 10'	Yes	2	5' - #2 Solid Tinned	205
EGRSS10LWG2/0	2' x 10'	Yes	2	5' - 2/0 Stranded	210
EGRSS10LWG4/0	2' x 10'	Yes	2	5' - 4/0 Stranded	215
EGRSS20LWG2T	2' x 20'	Yes	4	5' - #2 Solid Tinned	340
EGRSS20LWG2/0	2' x 20'	Yes	4	5' - 2/0 Stranded	345
EGRSS20LWG4/0	2' x 20'	Yes	4	5' - 4/0 Stranded	350

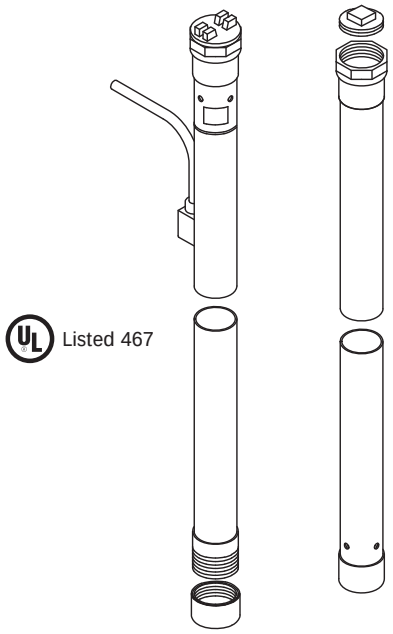
- Manufactured from corrosion resistant 300 series stainless steel.
- Other sizes and conductor types available. Contact the factory for details.

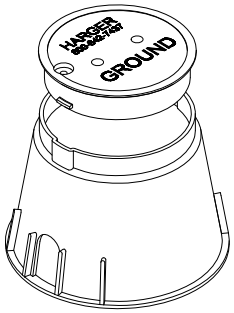
* Nominal Dimensions

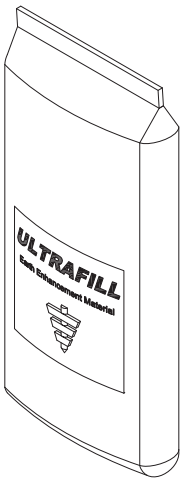
APPLICATION NOTES:

- 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".

Copper Sectional Enhanced Ground Rod Kits







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

• Other size conductors available. Contact the factory for details.

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".

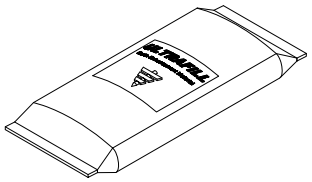
Ultrafill - Earth (Ground) Enhancement Material

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 horzontal trench or grid, or in vertical applications. Ultrafill is available in 25 and 50 pound coated woven polypropylene bags.

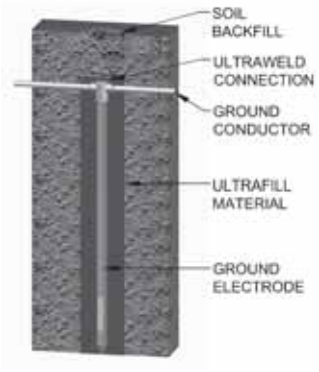


Part No.	Approx. Wt.
ULTRAFILL25	25 lbs.
ULTRAFILL	50 lbs.

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.

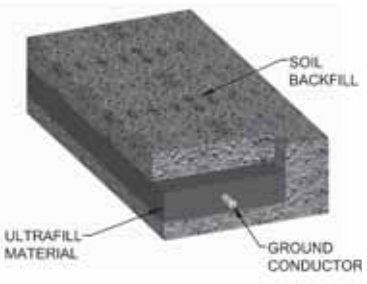


Pounds of Ultrafill Required Per Foot		
Hole Size	5/8" Ground Rod	2" EGR
4"	3.5	2.7
6"	8.1	7.3
8"	14.5	13.6
10"	22.6	21.8
12"	32.6	31.8

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 Required 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:

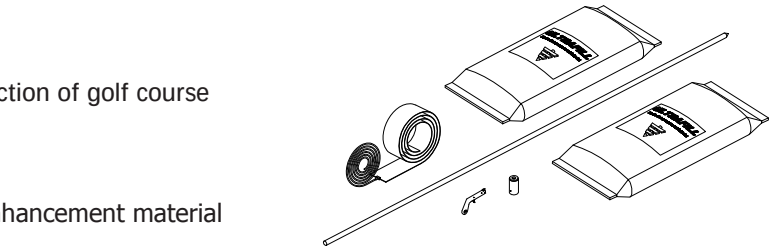
To mix Ultrafill into a slurry for pumping applications, use the following formula:

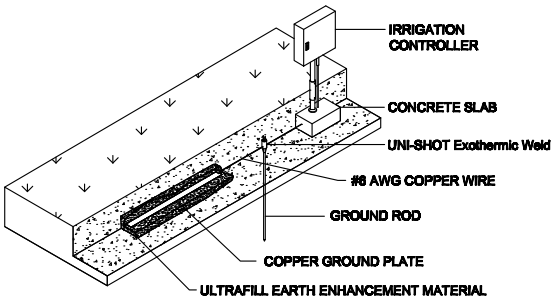
6 parts water
1 part bentonite
1 part Ultrafill.

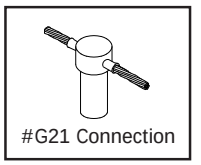
Irrigation Grounding Kits

Part No.	Approx. Wt.
IRRGRDKIT1	117 lbs.

- For grounding and lightning protection of golf course irrigation systems.
- **Kit includes:**
  (1) 5/8" x 8' ground rod
  (2) 50 lb. bags of Ultrafill earth enhancement material
  (1) Flint igniter
  (1) #G21-588 Uni-shot exothermic weld metal
  (1) 8' copper plate with a 25' tail of #6 AWG wire

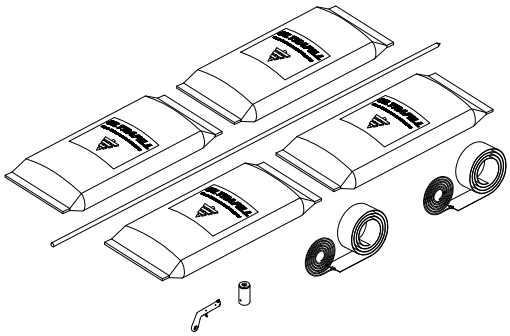


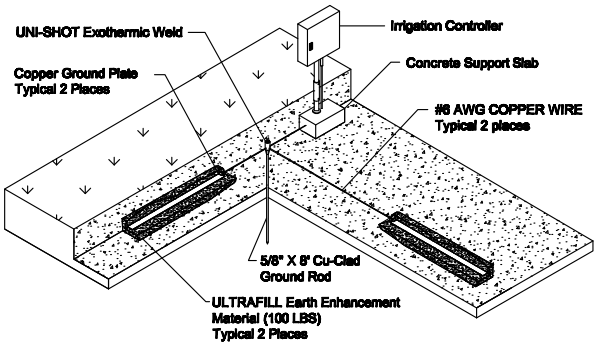


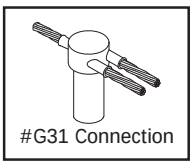

#G21 Connection

Part No.	Approx. Wt.
IRRGRDKIT2	227 lbs.

- For grounding and lightning protection of golf course irrigation systems.
- Used when connecting two kits to single irrigation controller.
- **Kit includes:**
  (1) 5/8" x 8' ground rod
  (4) 50 lb. bags of Ultrafill earth enhancement material
  (1) Flint igniter
  (1) #G31-588 Uni-shot exothermic weld metal
  (2) 8' copper plate with a 25' tail of #6 AWG wire



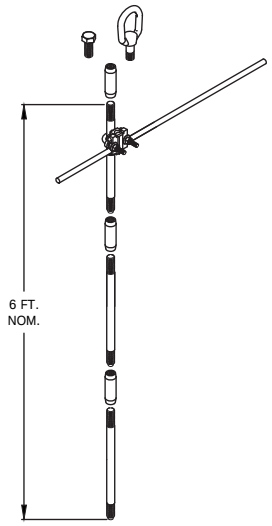



#G31 Connection

Mobile Ground Stake Kits

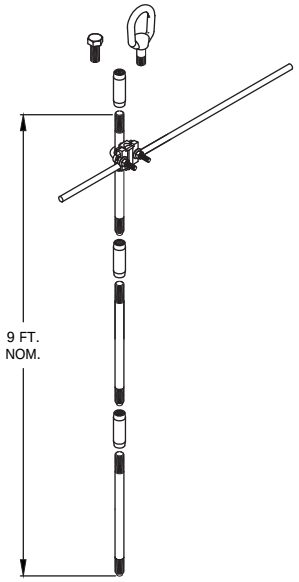
Part No.	Approx. Each Wt. (lbs.)
MOBGRDSTK582	14

- Consists of three 5/8" x 2' copper clad sectional ground rods, thus achieving an overall depth of 6'.
- Also contains three 5/8" ground rod couplers, one 5/8" drive stud, one u-bolt ground rod clamp and one 5/8" eyelet.



Part No.	Approx. Each Wt. (lbs.)
MOBGRDSTK583	20

- Consists of three 5/8" x 3' copper clad sectional ground rods, thus achieving an overall depth of 9'.
- Also contains three 5/8" ground rod couplers, one 5/8" drive stud, one u-bolt ground rod clamp and one 5/8" eyelet.



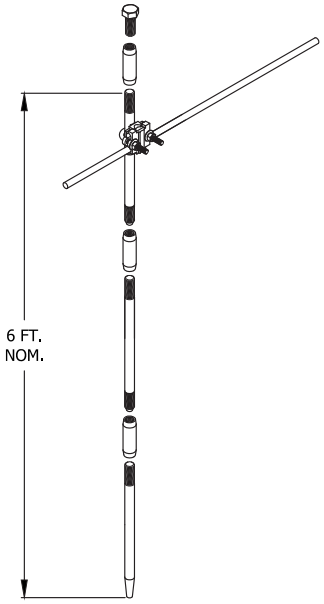
APPLICATION NOTES:

- 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.

Mobile Ground Stake Kits

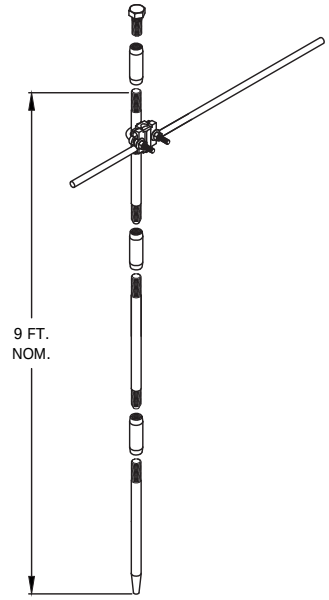
Part No.	Approx. Each Wt. (lbs.)
582GTEKIT	13-1/4

- NSN 5975-01-497-0438
- Consists of three 5/8" x 2' copper clad sectional ground rods, thus achieving an overall depth of 6'.
- Also contains three 5/8" ground rod couplers, one 5/8" drive stud and one u-bolt ground rod clamp.
- Bottom rod has tappered end to facilitate driving.



Part No.	Approx. Each Wt. (lbs.)
583GTEKIT	19-1/4

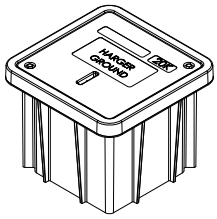
- NSN 5975-01-497-1496
- Consists of three 5/8" x 3' copper clad sectional ground rods, thus achieving an overall depth of 9'.
- Also contains three 5/8" ground rod couplers, one 5/8" drive stud and one u-bolt ground rod clamp.
- Bottom rod has tappered end to facilitate driving.



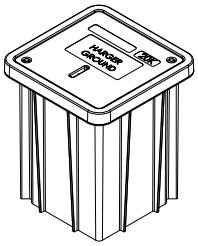
APPLICATION NOTES:

- 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.

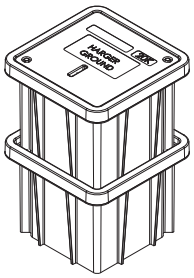
Ground Access Wells



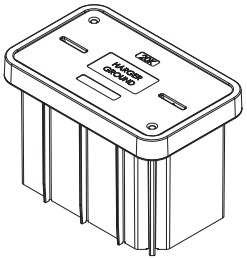
GAW121212HD



GAW121218HD



GAW121224HD*



GAW132418HD

Light Weight Polymer Concrete

Part No.	Dimensions	Approx. Each Wt. (lbs.)
GAW121212HD	12" x 12" x 12" deep	52
GAW121218HD	12" x 12" x 18" deep	57
GAW121224HD*	12" x 12" x 24" deep	67
GAW132418HD	13" x 24" x 18" deep	97-1/2

- Lid & Grade Ring manufactured from 20,000 PSI high density polymer concrete.
- Body manufactured from sheet molding compound for exceptional toughness and reduced weight.
- Comes with 20,000# rated covers.
- 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.

ASTM C-857 Specifications

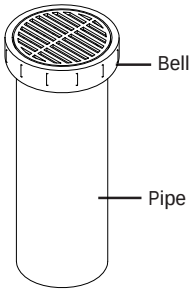
Cover Type	Cover Ratings	Live Load	30% Safety	Test Load	Test Area
Heavy Duty	10 Ton GVW (20,000#)	8,000#	10,400#	22,568#	10" x 10"
20,000# boxes and covers may be placed in locations that may see occasional non-deliberate heavy vehicles.					
Covers exceed their rating by at least 20% and exceed ASTM test loads. No polymer concrete box or cover should be placed in a full traffic, H-20, application. Meets W.U.C. 3.6.					

- GVW = Gross Vehicle Weight

Ground Access Wells

Tile Well with Grated Cover

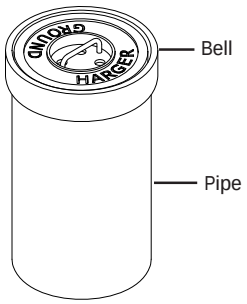
Part No.	Nominal Size	Length	Bell I.D. Minimum	Pipe I.D. (Approx.)	Cover Type	Approx. Each Wt. (lbs.)
358T	8"	24"	10-1/2"	8"	Cast Iron Grated	57
360T	10"	24"	12-3/4"	10"	Cast Iron Grated	83
362T	12"	24"	15-1/8"	12"	Cast Iron Grated	140
368T	18"	24"	22-1/4"	18"	Cast Iron Grated	222



- Available in 8", 10", 12" and 18" diameters.
- Diameter is measured on inside diameter of access well bottom.
- Must be shipped by truck only.

Tile Well with Concrete Cover

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

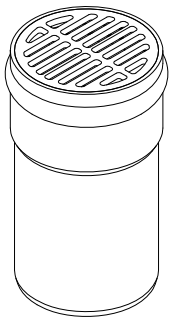


- Available in 8", 10" and 12" diameters.
- Diameter is measured on inside diameter of access well bottom.
- Must be shipped by truck only.

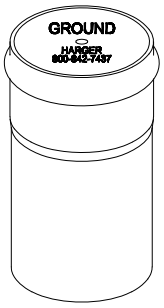
APPLICATION NOTES:

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

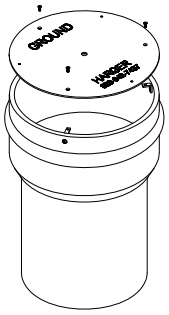
Ground Access Wells



360PBG



360PBS



360PBSTP

PVC Belled Hub Wells with Cover

Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
360PBG	10"	24"	Cast Iron Grated	20
360PBS	10"	24"	Flat Steel	19
360PBSTP	10"	24"	Tamper Resistant	27
362PBG	12"	24"	Cast Iron Grated	28
362PBS	12"	24"	Flat Steel	26
362PBSTP	12"	24"	Tamper Resistant	28
368PBG	18"	24"	Cast Iron Grated	71
368PBS	18"	24"	Flat Steel	58
368PBSTP	18"	24"	Tamper Resistant	58

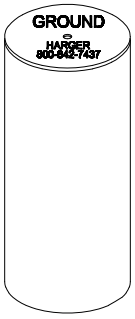
- Available in 10", 12" and 18" diameters.
- Schedule 40 PVC wells feature a belled hub.
- Flat steel covers are 3/16" thick commercial grade steel with a zinc/ultraseal coating.
- Other lids available. See page 45.

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

Ground Access Wells

PVC Well with Cover

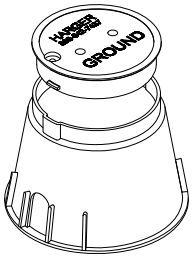
Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
358PP	8"	24"	Plastic	12
358PS	8"	24"	Flat Steel	14
360PP	10"	24"	Plastic	15
360PS	10"	24"	Flat Steel	19
362PS	12"	24"	Flat Steel	22



- 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.

HDPE Well with Cover

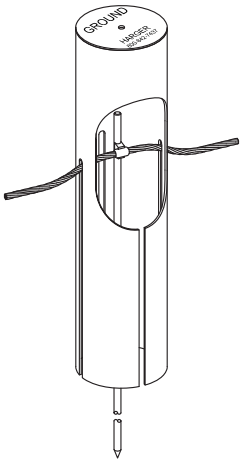
Part No.	Diameter	Length	Cover Type	Approx. Each Wt. (lbs.)
GAW910	9"	10-1/4"	HDPE	4-1/2



- 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.
- For use in non-vehicular traffic areas.

PVC Slotted Well with Cover

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



- 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.

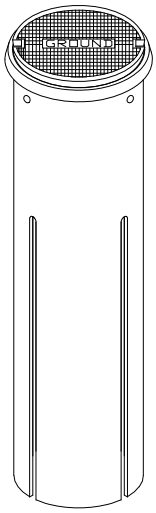
APPLICATION NOTES:
- Provides ready access to ground electrode for testing and inspection purposes.
- To prevent displacement by frost, the access well must be longer than the frost line is deep.

Ground Access Wells

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 Resistant	61
360P42CILS80	10"	42"	Cast Iron	67
360P42CILS80TP	10"	42"	Tamper Resistant	67

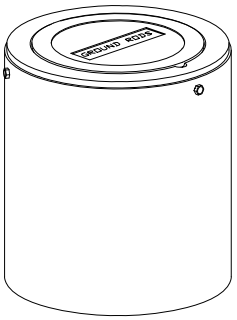
- 10" diameter Schedule 80 PVC well.
- Available in 36" and 42" lengths.
- Four 27" slots allow for ground electrode connections to be made before installation of test well.
- Cast iron cover fits into cast iron ring for extra support.
- For use in traffic areas.



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

- 12" diameter Schedule 80 PVC well.
- Available in 12", 24" and 30" lengths.
- Cast iron cover fits into cast iron ring for extra support.
- For use in traffic areas.



APPLICATION NOTES:

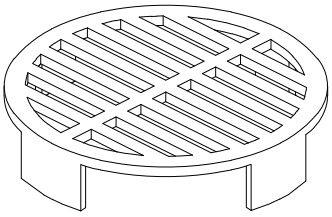
- Provides ready access to ground electrode for testing and inspection purposes.
- To prevent displacement by frost, the access well must be longer than the frost line is deep.

Ground Access Well Covers

Ground access well covers are available in cast iron grated, flat steel, plastic and concrete.

Cast Iron Grated Covers

Part No.	Diameter	Fits Test Well	Approx. Each Wt. (lbs.)
10PBG	10-1/4"	358T & 360PBG	7
12PBG	12-1/2"	360T & 362PBG	10
12TG	14-3/4"	362T	18
18PBG	18-3/8"	368PBG	29
18TG	22"	368T	36



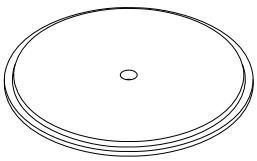
Flat Steel Covers

Part No.	Diameter	Fits Test Well	Approx. Each Wt. (lbs.)
8PS	8-5/8"	358PS & 358P42	3
10PS	10-5/8"	360PS & 360P42	5
10PBS	11-1/4"	360PBS	6
12PBS	13-1/4"	362PBS	7
12PS	12-3/4"	362PS	8
18PBS	19-7/8"	368PBS	16

- Manufactured from 3/16" commercial grade steel with a zinc/ultraseal coating.

Plastic Covers

Part No.	Diameter	Fits Test Well	Approx. Each Wt. (lbs.)
6PP	6-5/8"	356PP	1
8PP	8-5/8"	358PP & 358PP42	1
10PP	10-3/4"	360PP & 360PP42	2



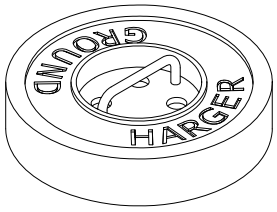
Inverted View of Cover

Top View of Cover

- Manufactured from High Density Polyethylene.

Concrete Covers

Part No.	Diameter	Fits Test Well	Approx. Each Wt. (lbs.)
8CC	10-7/8" x 2"	358TC	16
10CC	12-1/2" x 2"	360TC	24
12CC	14-3/4" x 2-3/4"	362TC	29



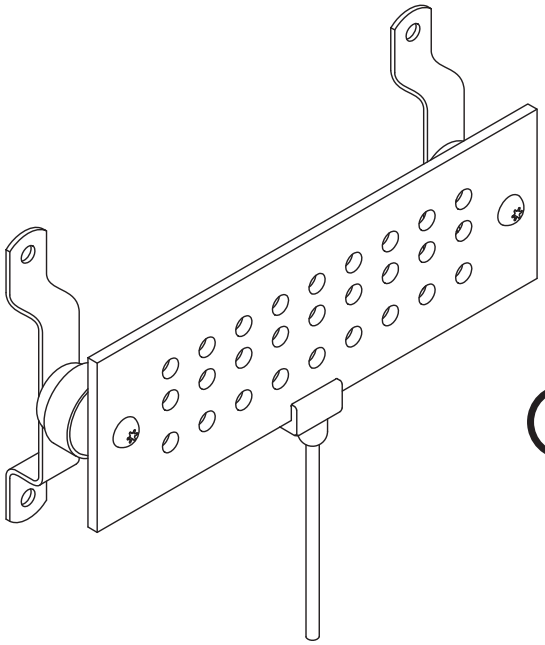
- Specifically made for Tile Access Wells.

Section 1.3

Ground Bars & Accessories

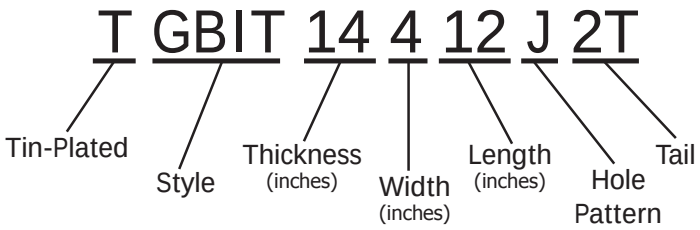
Index

Harger Ground Bar Numbering System



Listed 467

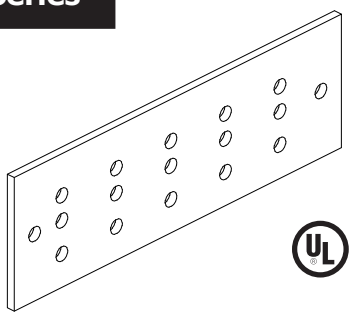
Simply follow the steps outlined below to specify the style and size of the ground bar you need. The following example is a ground bar with wall mounting brackets, insulators, and an exothermically welded tail. The ground bar is tin plated 1/4" thick, 4" wide and 12" long. It has a hole pattern "J" with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



1. **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 plexiglass 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.
2. **Size:** Thickness, width, length in inches.
3. **Hole Pattern:** See Pages 51-52 to specify hole pattern.
4. **Tail:** Specify American Wire Gauge (AWG) size and stranding required. 25' length is standard unless otherwise requested.
5. **T:** Prefix designates electro-tin plated ground bar.

Ground Bar Styles

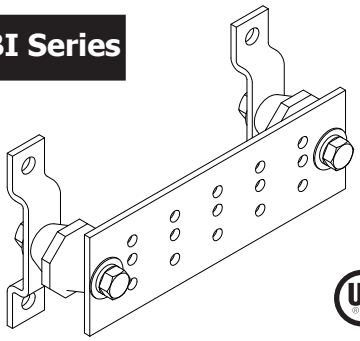
GB Series



Listed 467

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

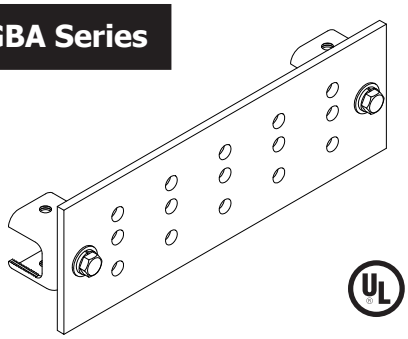
HDGBI Series



Listed 467

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

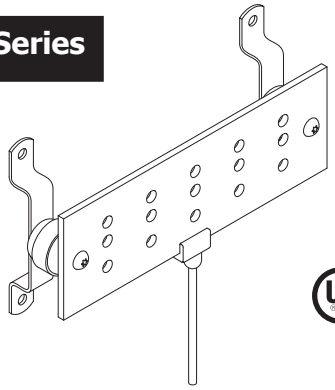
GBA Series



Listed 467

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

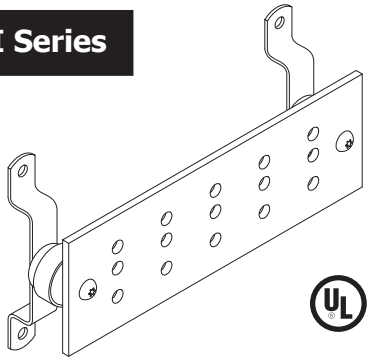
GBIT Series



Listed 467

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

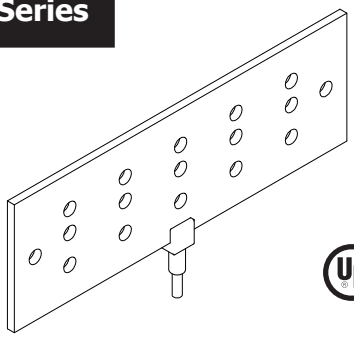
GBI Series



Listed 467

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

GBT Series

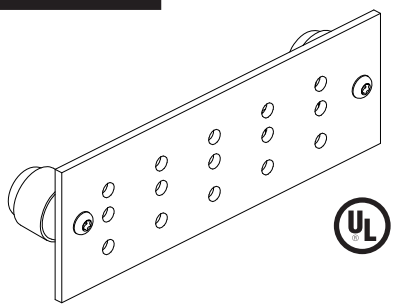


Listed 467

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

Ground Bar Styles

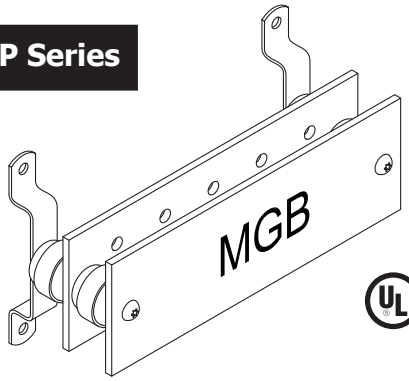
GBS Series



Listed 467

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

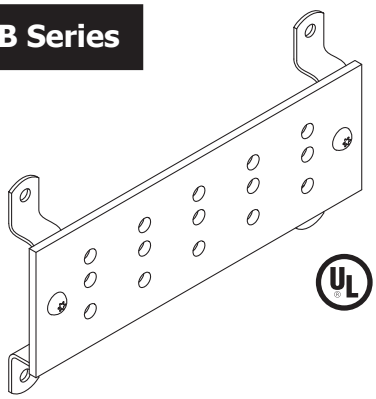
GBIP Series



Listed 467

Ground **B**ar with **I**nsulators, Wall Mounting Brackets and **P**lexiglass Cover

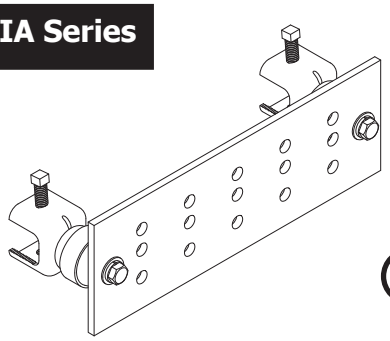
GBB Series



Listed 467

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

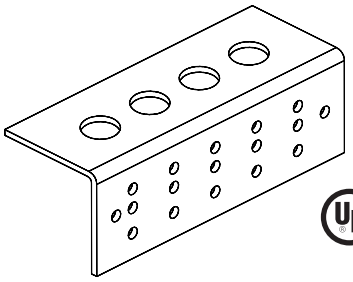
GBIA Series



Listed 467

Ground Bar with **I**nsulators and Stainless Steel Angle **A**dapters

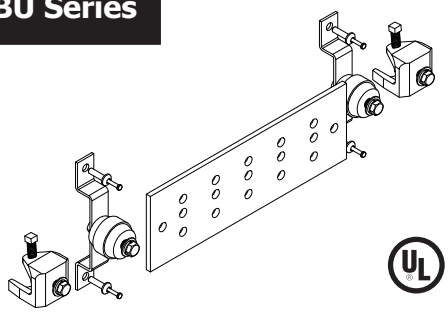
BGB Series



Listed 467

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

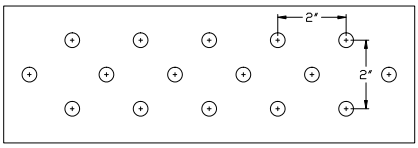
GBU Series



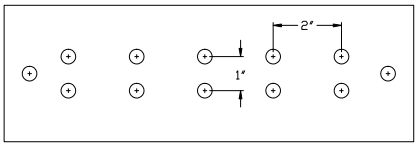
Listed 467

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

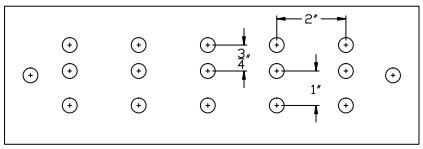
Ground Bar Hole Patterns



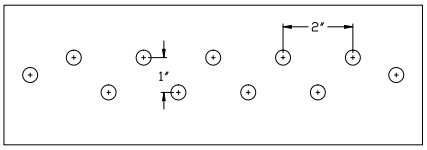
" A "



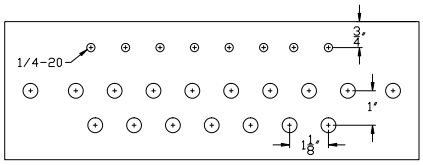
" B "



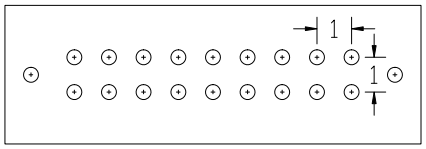
" C "



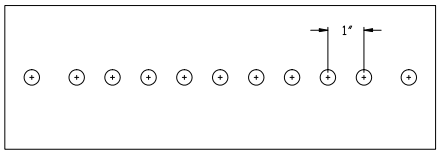
" D "



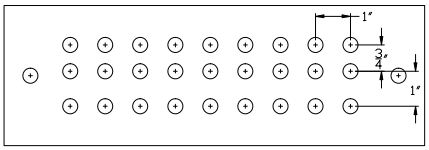
" F "



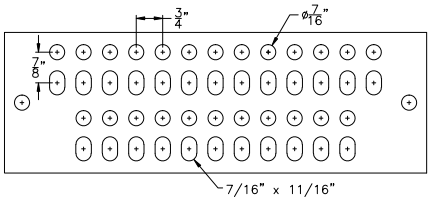
" G "



" H "



" J "

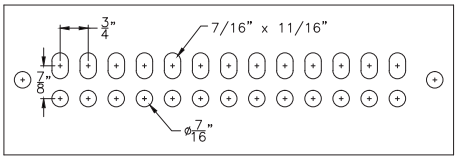


" M "

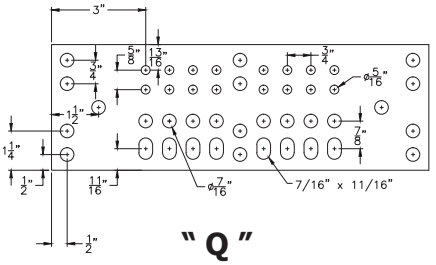
NOTES:

- 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.
- Slotted hole patterns accommodate "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- Above bar patterns represent a 12" ground bar.
- All bars are available with electro-tin plating. Add prefix T to part number.

Ground Bar Hole Patterns



" P "



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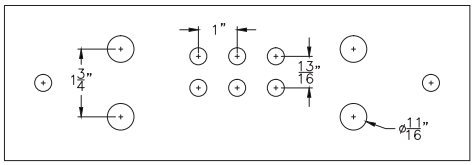
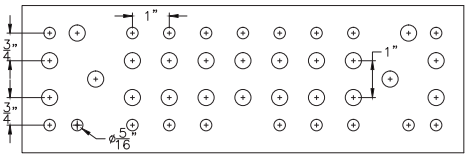
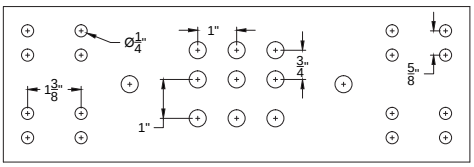


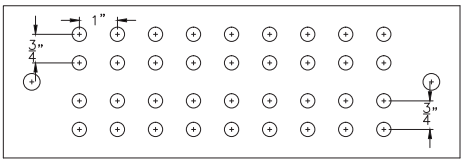
" R "



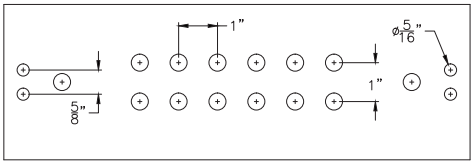
" T "



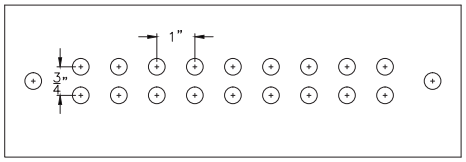
" V "



" W "



" X "



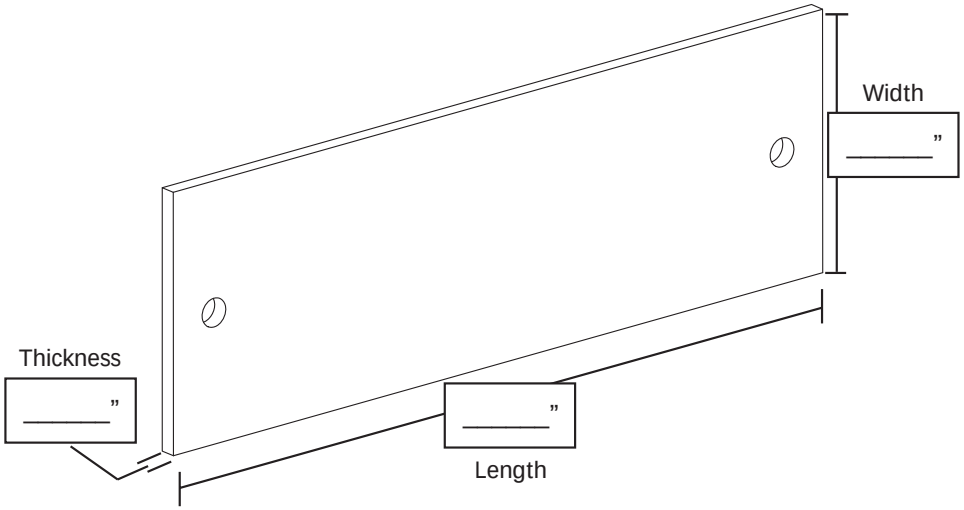
" Z "

" 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.
- Slotted hole patterns accommodate "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- Above bar patterns represent a 12" ground bar.
- All bars are available with electro-tin plating. Add prefix T to part number.

Custom Ground Bar Design Sheet



Thickness:_____ Width:_____ Length: _____

Tamper Resistant Hardware: Y or N Part# _____

Plating: Y or N Type: _____

Holes: Punched Tapped Combo

Size Punched:_____ Size Tapped: _____

Exothermically Welded Tail: Y or N Size: _____

Stranded Solid Bare Tinned Insulated

Length:_____ (Show location of weld on bar.)

Standoff: Y or N Dim. Bar: _____

Type: Insulator_____ Nylon All-Thread _____

Plastic Cover: Y or N

Thickness:_____ Width:_____ Length: _____

Lettering: Y or N Size:_____ Color: _____

Text Shall Read Exactly as Follows:

_____

_____

(Note: Show Cover Layout on a Separate Sheet.)

Other Options:_____

_____

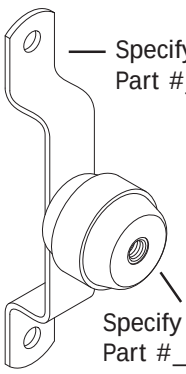
Bar Engraving / Etching: Y or N

Text Shall Read Exactly as Follows:

_____

_____

Simply fill out your requirements, submit the sheet to our factory and we will produce your custom ground bar in a timely fashion.



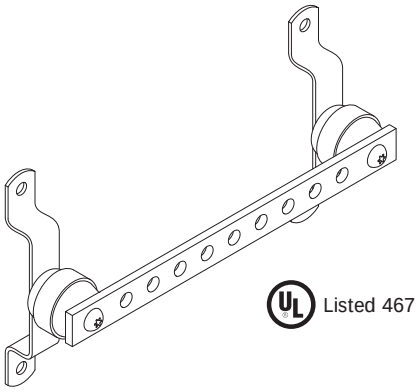
Insulators & Brackets can be found on pages 73 - 75.

GBI Ground Bars

"H" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1416H	1/4" x 1" x 6"	H	3	2
GBI14112H	1/4" x 1" x 12"	H	9	3
GBI14116H	1/4" x 1" x 16"	H	13	4

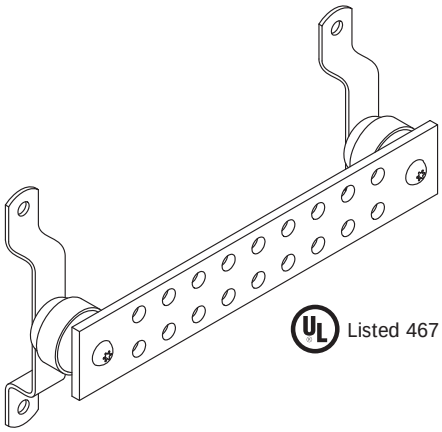
- Mounting holes not included in total No. of Holes.
- Accommodates one hole lugs using 3/8" hardware.
- 12" bar pictured. Holes are 7/16" diameter.



"G" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1426G	1/4" x 2" x 6"	G	6	2
GBI14212G	1/4" x 2" x 12"	G	18	3
GBI14216G	1/4" x 2" x 16"	G	26	4

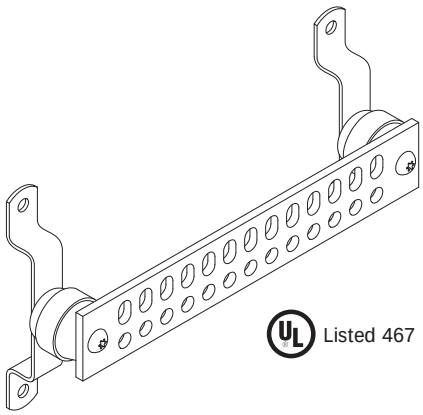
- Mounting holes not included in total No. of Holes.
- Accommodates "C" spaced two hole lugs (1" on center).
- 12" bar pictured. Holes are 7/16" diameter.



"P" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1426P	1/4" x 2" x 6"	P	10	2
GBI14212P	1/4" x 2" x 12"	P	26	3
GBI14216P	1/4" x 2" x 16"	P	34	4

- Mounting holes not included in total No. of Holes.
- 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".



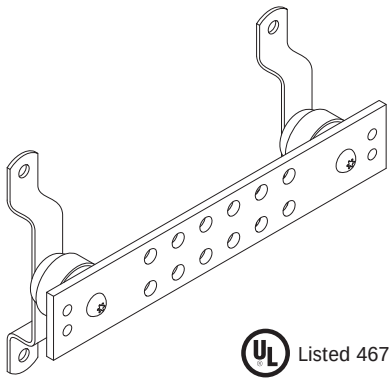
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Bars available electro-tin plated. When ordering, add prefix T to part number.
- Other sizes available. Please contact factory for more information.

GBI Ground Bars

"X" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1426X	1/4" x 2" x 6"	X	6	2
GBI14212X	1/4" x 2" x 12"	X	16	3
GBI14216X	1/4" x 2" x 16"	X	24	4
GBI14220X	1/4" x 2" x 20"	X	32	5
GBI14224X	1/4" x 2" x 24"	X	40	6

- Mounting holes not included in total No. of Holes.
- 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.

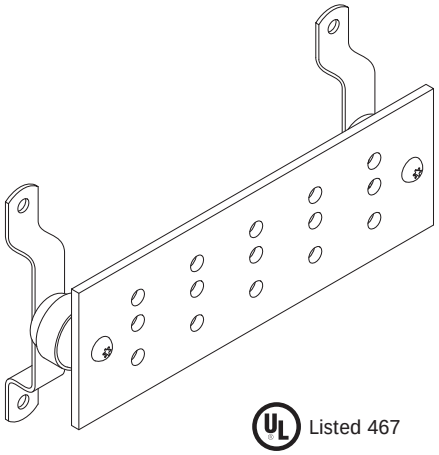


Listed 467

"C" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1446C	1/4" x 4" x 6"	C	6	3
GBI14412C	1/4" x 4" x 12"	C	15	5
GBI14416C	1/4" x 4" x 16"	C	21	7
GBI14420C	1/4" x 4" x 20"	C	27	8
GBI14424C	1/4" x 4" x 24"	C	33	9

- Mounting holes not included in total No. of Holes.
- 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.



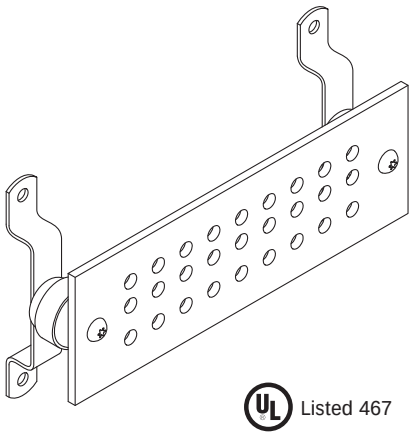
Listed 467

NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Bars available electro-tin plated. When ordering, add prefix T to part number.
- Other sizes available. Please contact factory for more information.

GBI Ground Bars

"J" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1446J	1/4" x 4" x 6"	J	9	3
GBI14412J	1/4" x 4" x 12"	J	27	5
GBI14416J	1/4" x 4" x 16"	J	39	7
GBI14420J	1/4" x 4" x 20"	J	51	8
GBI14424J	1/4" x 4" x 24"	J	63	9

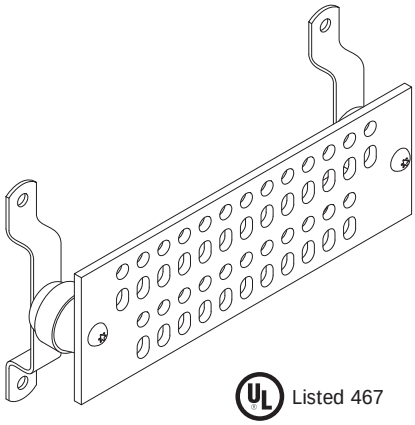


Listed 467

- Mounting holes not included in total No. of Holes.
- 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" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI1446M	1/4" x 4" x 6"	M	16	3
GBI14412M	1/4" x 4" x 12"	M	48	5
GBI14416M	1/4" x 4" x 16"	M	68	7
GBI14420M	1/4" x 4" x 20"	M	88	8
GBI14424M	1/4" x 4" x 24"	M	112	9



Listed 467

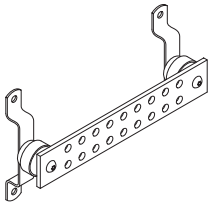
- Mounting holes not included in total No. of Holes.
- Accommodates "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- 12" bar pictured. Holes are 7/16" diameter and slots are 7/16" x 11/16".

NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Bars available electro-tin plated. When ordering, add prefix T to part number.
- Other sizes available. Please contact factory for more information.

GBI Ground Bar Kits

2" Kits

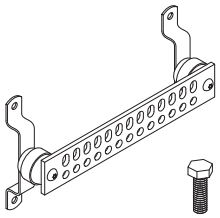
Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI14210GKT*	1/4" x 2" x 10"	G	14	5-1/2
GBI14212GKT*	1/4" x 2" x 12"	G	18	6



Listed 467

• Refer to page 54.

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI14210PKT*	1/4" x 2" x 10"	P	20	5-1/2
GBI14212PKT*	1/4" x 2" x 12"	P	26	6

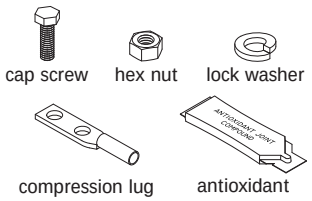


Listed 467

• Refer to page 54.

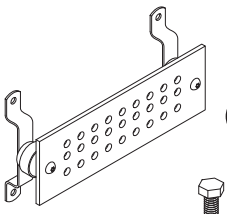
***Kit Includes:**

(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
(18) LW6S: 3/8"-16 SS lock washer
(18) N616S: 3/8"-16 SS hex nut
(1) HCAJC1/2: 1/2 oz. tube of antioxidant



4" Kits

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI14412JKT*	1/4" x 4" x 12"	J	27	8
GBI14420JKT*	1/4" x 4" x 20"	J	51	10

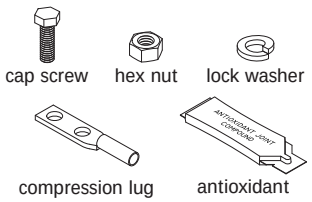


Listed 467

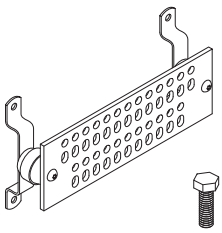
• Refer to page 56.

***Kit 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
(24) LW6S: 3/8"-16 SS lock washer
(24) N616S: 3/8"-16 SS hex nut
(1) HCAJC1/2: 1/2 oz. tube of antioxidant



Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBI14412MKT*	1/4" x 4" x 12"	M	48	8
GBI14420MKT*	1/4" x 4" x 20"	M	88	11

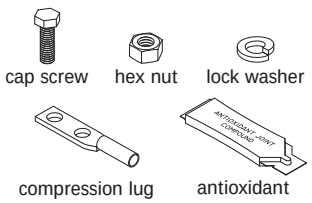


Listed 467

• Refer to page 56.

***Kit 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
(44) LW6S: 3/8"-16 SS lock washer
(44) N616S: 3/8"-16 SS hex nut
(1) HCAJC1/2: 1/2 oz. tube of antioxidant

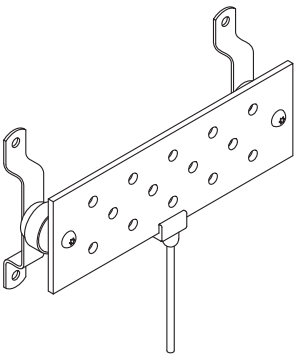


GBIT Ground Bars

"A" Pattern

Part No.	Bar Size	Hole Pattern	Conductor Type (AWG)	No. of Holes	Approx. Each Wt. (lbs.)
GBIT14412A2T	1/4" x 4" x 12"	A	2T	14	13
GBIT14416A2T	1/4" x 4" x 16"	A	2T	20	15
GBIT14420A2T	1/4" x 4" x 20"	A	2T	26	16
GBIT14424A2T	1/4" x 4" x 24"	A	2T	32	17

- Mounting holes not included in total No. of Holes.
- 12" bar pictured. Holes are 7/16" diameter.

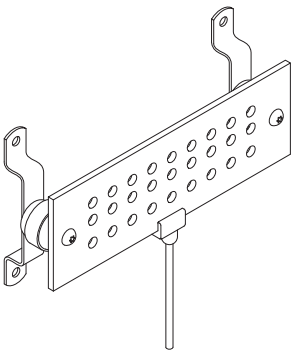


UL Listed 467

"J" Pattern

Part No.	Bar Size	Hole Pattern	Conductor Type (AWG)	No. of Holes	Approx. Each Wt. (lbs.)
GBIT1446J2T	1/4" x 4" x 6"	J	2T	9	11
GBIT14412J2T	1/4" x 4" x 12"	J	2T	27	13
GBIT14416J2T	1/4" x 4" x 16"	J	2T	39	15
GBIT14420J2T	1/4" x 4" x 20"	J	2T	51	16
GBIT14424J2T	1/4" x 4" x 24"	J	2T	63	17

- Mounting holes not included in total No. of Holes.
- 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.



UL Listed 467

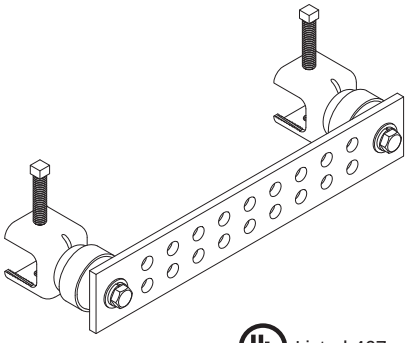
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Comes with a 25' exothermically welded tail.
- Bars available electro-tin plated. When ordering, add prefix T to part number.
- Other sizes available. Please contact factory for more information.

GBIA Ground Bars

"Z" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBIA1426Z	1/4" x 2" x 6"	Z	6	2
GBIA14212Z	1/4" x 2" x 12"	Z	18	3
GBIA14216Z	1/4" x 2" x 16"	Z	26	4
GBIA14220Z	1/4" x 2" x 20"	Z	34	5

- Mounting holes not included in total No. of Holes.
- Accommodates "B" spaced two hole lugs (3/4" on center).
- 12" bar pictured. Holes are 7/16" diameter.

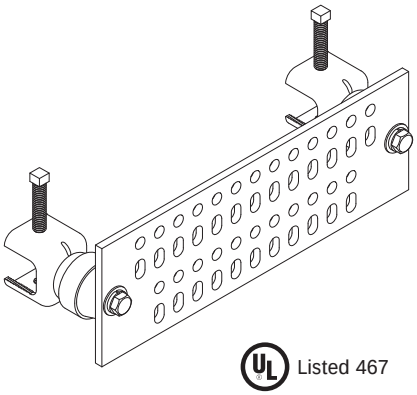


Listed 467

"M" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBIA14412M	1/4" x 4" x 12"	M	48	5
GBIA14416M	1/4" x 4" x 16"	M	70	7
GBIA14420M	1/4" x 4" x 20"	M	88	8
GBIA14424M	1/4" x 4" x 24"	M	106	9

- Mounting holes not included in total No. of Holes.
- 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".



Listed 467

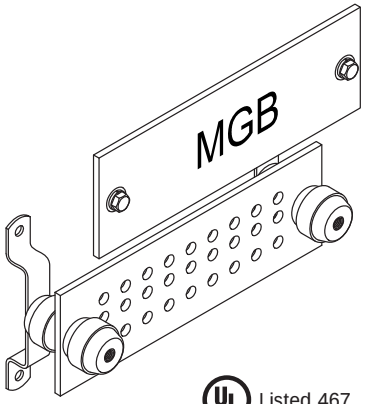
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Bars available electro-tin plated. When ordering, add prefix T to part number.
- Ground Bar with insulators and stainless steel angle adapters.
- Other sizes available. Please contact factory for more information.

GBIP Ground Bars

"J" Pattern

Part No.	Bar Size	Hole Pattern	No. of Holes	Approx. Each Wt. (lbs.)
GBIP1446JMGB	1/4" x 4" x 6"	J	9	5
GBIP14412JMGB	1/4" x 4" x 12"	J	27	7
GBIP14416JMGB	1/4" x 4" x 16"	J	39	9
GBIP14420JMGB	1/4" x 4" x 20"	J	51	11

- Mounting holes not included in total No. of Holes.
- 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.
- Plexiglass cover with MGB lettering. Other lettering available.

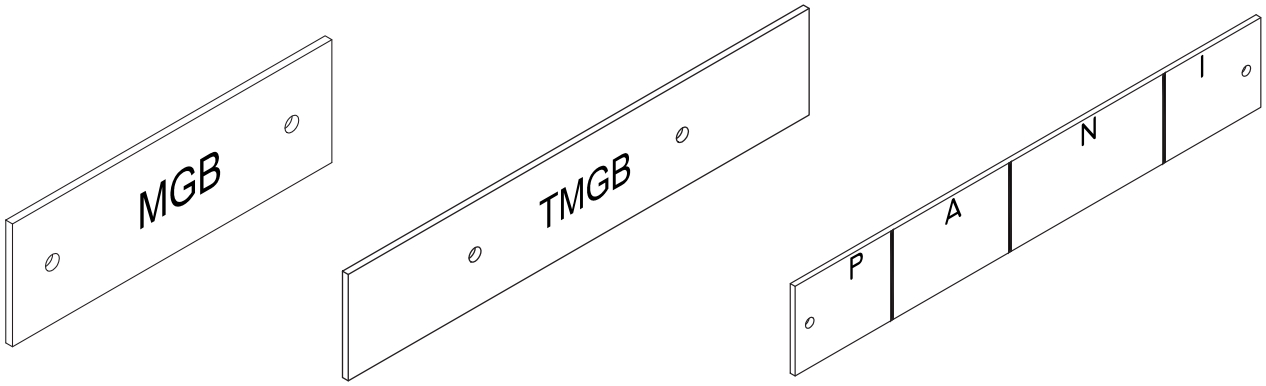


Listed 467

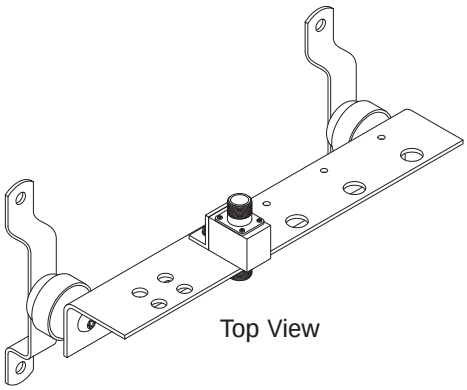
NOTES:
- Manufactured from electrolytic tough pitch copper alloy 110.
- Other sizes available. Please contact factory for more information.

Plexiglass Covers

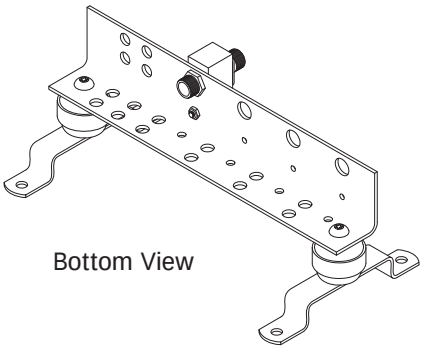
All ground bars are available with lettered plexiglass covers.
Minimum lettering height is 3/8". Lettering available in several different colors.
Standard cover thickness is 1/4". Other thicknesses available.
Please contact our factory with your special needs.



BGB Ground Bars



Top View

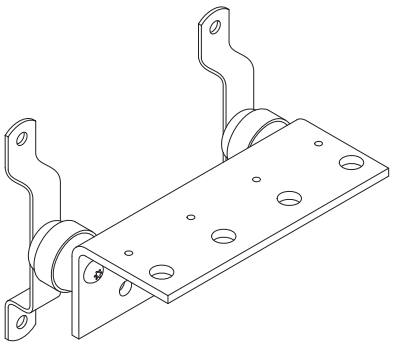


Bottom View

Part No.	Bar Size	No. of Arrestors	Approx. Each Wt. (lbs.)
BGBI1848.75TEL	1/8" x 4" x 8-3/4"	2	2-1/2
BGBI18413.25TEL	1/8" x 4" x 13-1/4"	4	3-1/2
BGBI18417.75TEL	1/8" x 4" x 17-3/4"	6	4
BGBI18428TEL	1/8" x 4" x 28"	8	5-1/2

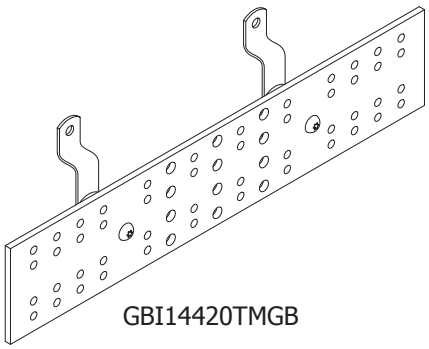
- Manufactured from electrolytic tough pitch copper alloy 110.
- Accommodates "B" spaced two hole lugs (3/4" on center).
- Accepts bulkhead style surge arrestors with N female connectors.
- Can be mounted vertically or horizontally.
- Other sizes/styles available. Please contact factory for more information.
- Surge arrestors not included.

BGBI1468ISB4FAA2



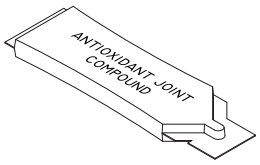
- 1/4" x 6" x 8" electrolytic tough pitch copper alloy 110.
- Accommodates "C" spaced two hole lugs (1" on center).
- Accepts 4 bulkhead style surge arrestors with N female connectors.
- Can be mounted vertically or horizontally.
- Other sizes/styles available. Please contact factory for more information.
- Approximate weight is 5 pounds.

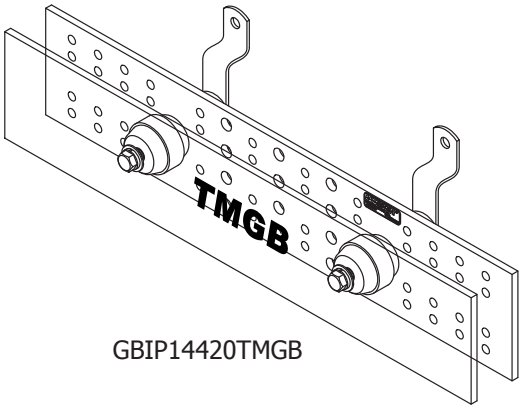
TIA-607 Style Telecommunications Main Grounding Busbars



GBI14420TMGB

Listed 467





GBIP14420TMGB

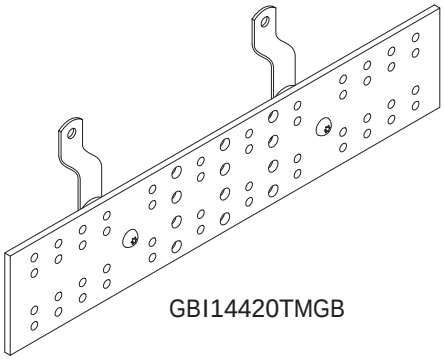
TMGB Busbars

Part No.	Bar Size	Material	Plexiglass Cover	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14412TMGB	1/4" x 4" x 12"	Copper	No	12	6	6-1/2
GBIP14412TMGB*	1/4" x 4" x 12"	Copper	Yes	12	6	7
TGBI14412TMGB	1/4" x 4" x 12"	Electro Tin Plated	No	12	6	6-1/2
TGBIP14412TMGB*	1/4" x 4" x 12"	Electro Tin Plated	Yes	12	6	7
GBI14420TMGB	1/4" x 4" x 20"	Copper	No	24	6	9
GBIP14420TMGB*	1/4" x 4" x 20"	Copper	Yes	24	6	9-1/2
TGBI14420TMGB	1/4" x 4" x 20"	Electro Tin Plated	No	24	6	9
TGBIP14420TMGB*	1/4" x 4" x 20"	Electro Tin Plated	Yes	24	6	9-1/2
GBI14424TMGB	1/4" x 4" x 24"	Copper	No	28	10	10-1/2
GBIP14424TMGB*	1/4" x 4" x 24"	Copper	Yes	28	10	11
TGBI14424TMGB	1/4" x 4" x 24"	Electro Tin Plated	No	28	10	10-1/2
TGBIP14424TMGB*	1/4" x 4" x 24"	Electro Tin Plated	Yes	28	10	11

*TMGB is standard lettering in black with a minimum lettering height of 3/8". Other sizes available. Please contact factory for more information. See page 60 for plexiglass covers.

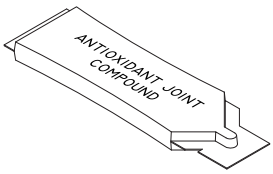
- 1/4" thick x 4" wide electrolytic tough pitch copper alloy 110.
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (#HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" holes sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Other sizes available. Please contact factory for more information.
- Meets "BICSI" and EIA/TIA 607 standards.

TIA-607 Style Telecommunications Main Grounding Busbar Kits



GBI14420TMGB

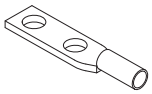
Listed 467



hex nut

lock washer

cap screw



compression lug

TMGB Busbar Kits

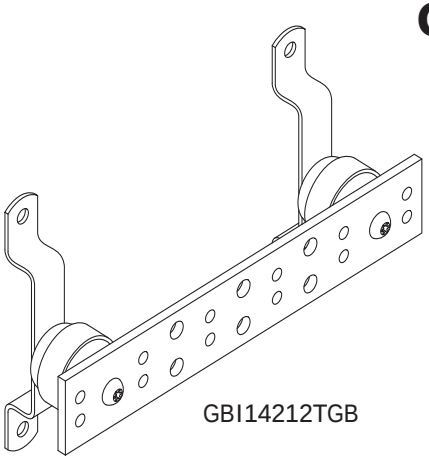
Part No.	Bar Size	Material	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI14412TMGBKT	1/4" x 4" x 12"	Copper	12	6	8
TGBI14412TMGBKT	1/4" x 4" x 12"	Electro Tin Plated	12	6	8
GBI14420TMGBKT	1/4" x 4" x 20"	Copper	24	6	11
TGBI14420TMGBKT	1/4" x 4" x 20"	Electro Tin Plated	24	6	11
GBI14424TMGBKT	1/4" x 4" x 24"	Copper	28	10	12
TGBI14424TMGBKT	1/4" x 4" x 24"	Electro Tin Plated	28	10	12

Kit Includes:

(1) Ground bar with brackets and insulators
(6) GECLB62A: #6 compression lug
(1) GECLB22C: #2 compression lug
(1) GECLB1/02C: 1/0 compression lug
(1) GECLB2/02C: 2/0 compression lug
(1) GECLB3/02C: 3/0 compression lug
(1) GECLB4/02C: 4/0 compression lug
(12) CS46S: 1/4"-20 x 3/4" SS hex head cap screw
(12) LW4S: 1/4"-20 SS lock washer
(12) N420S: 1/4"-20 SS hex nut
(6) CS68S: 3/8"-16 x 1" SS hex head cap screw
(6) LW6S: 3/8"-16 SS lock washer
(6) N616S: 3/8"-16 SS hex nut

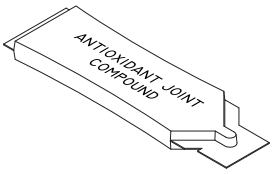
- Other sizes available. Please contact factory for more information.
- Includes one 1/2 oz. tube of antioxidant (#HCAJC1/2).
- Meets "BICSI" and EIA/TIA 607 standards.

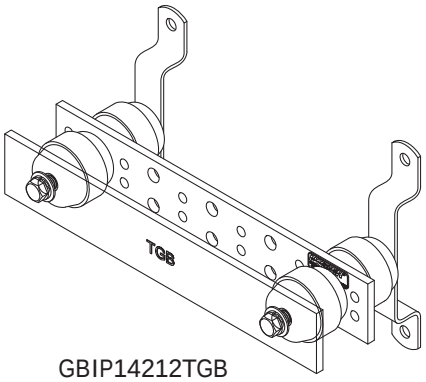
TIA-607 Style Telecommunications Grounding Busbars



GBI14212TGB

Listed 467





GBIP14212TGB

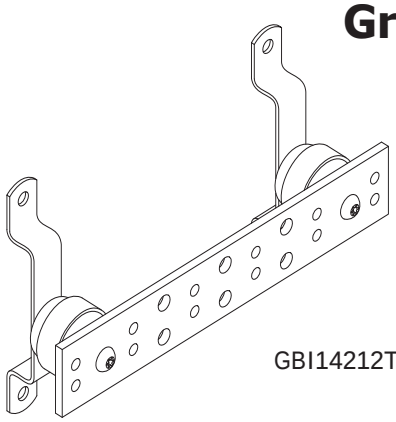
TGB Busbars

Part No.	Bar Size	Material	Plexiglass Cover	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI1426TGB	1/4" x 2" x 6"	Copper	No	2	2	1-1/2
GBIP1426TGB*	1/4" x 2" x 6"	Copper	Yes	2	2	2
TGBI1426TGB	1/4" x 2" x 6"	Electro Tin Plated	No	2	2	1-1/2
TGBIP1426TGB*	1/4" x 2" x 6"	Electro Tin Plated	Yes	2	2	2
GBI14210TGB	1/4" x 2" x 10"	Copper	No	4	3	3
GBIP14210TGB*	1/4" x 2" x 10"	Copper	Yes	4	3	3-1/2
TGBI14210TGB	1/4" x 2" x 10"	Electro Tin Plated	No	4	3	3
TGBIP14210TGB*	1/4" x 2" x 10"	Electro Tin Plated	Yes	4	3	3-1/2
GBI14212TGB	1/4" x 2" x 12"	Copper	No	6	3	4
GBIP14212TGB*	1/4" x 2" x 12"	Copper	Yes	6	3	4-1/2
TGBI14212TGB	1/4" x 2" x 12"	Electro Tin Plated	No	6	3	4
TGBIP14212TGB*	1/4" x 2" x 12"	Electro Tin Plated	Yes	6	3	4-1/2

*TGB is standard lettering in black with a minimum lettering height of 3/8". Other sizes available. Please contact factory for more information. See page 60 for plexiglass cover.

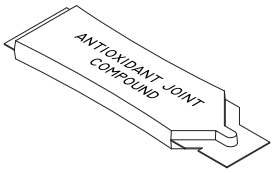
- 1/4" thick x 4" wide electrolytic tough pitch copper alloy 110.
- Includes 1-1/2" insulators and 1" offset stainless steel mounting brackets.
- Includes one 1/2 oz. tube of antioxidant (#HCAJC1/2).
- 5/16" hole sets 5/8" on centers. Accommodates "A" spaced two hole compression lugs.
- 7/16" hole sets 1" on centers. Accommodates "C" spaced two hole compression lugs.
- Other sizes available. Please contact factory for more information.
- Meets "BICSI" and EIA/TIA 607 standards.

TIA-607 Style Telecommunications Grounding Busbar Kits



GBI14212TGB

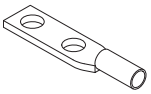
Listed 467



hex nut

lock washer

cap screw



compression lug

TGB Busbar Kits

Part No.	Bar Size	Material	No. of 5/16" Hole Sets	No. of 7/16" Hole Sets	Approx. Each Wt. (lbs.)
GBI1426TGBKT	1/4" x 2" x 6"	Copper	2	2	3
TGBI1426TGBKT	1/4" x 2" x 6"	Electro Tin Plated	2	2	3
GBI14210TGBKT	1/4" x 2" x 10"	Copper	4	3	4-1/2
TGBI14210TGBKT	1/4" x 2" x 10"	Electro Tin Plated	4	3	4-1/2
GBI14212TGBKT	1/4" x 2" x 12"	Copper	6	3	5
TGBI14212TGBKT	1/4" x 2" x 12"	Electro Tin Plated	6	3	5

Kit Includes:

(1) Ground bar with brackets and insulators
(6) GECLB62A: #6 compression lug
(1) GECLB22C: #2 compression lug
(1) GECLB1/02C: 1/0 compression lug
(1) GECLB2/02C: 2/0 compression lug
(1) GECLB3/02C: 3/0 compression lug
(12) CS46S: 1/4"-20 x 3/4" SS hex head cap screw
(12) LW4S: 1/4"-20 SS lock washer
(12) N420S: 1/4"-20 SS hex nut
(6) CS68S: 3/8"-16 x 1" SS hex head cap screw
(6) LW6S: 3/8"-16 SS lock washer
(6) N616S: 3/8"-16 SS hex nut

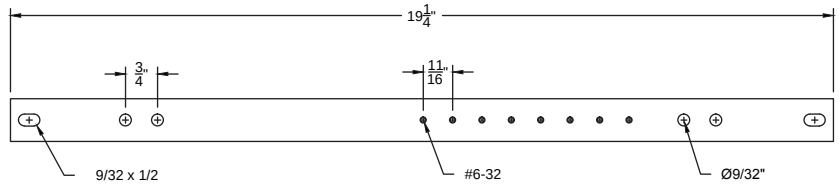
- Other sizes available. Please contact factory for more information.
- Includes one 1/2 oz. tube of antioxidant (#HCAJC1/2).
- Meets "BICSI" and EIA/TIA 607 standards.

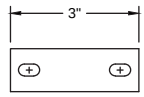
Telecommunications Equipment Rack Grounding Busbars & Kits

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 Pictured

Listed 467





Bar Splice Plate

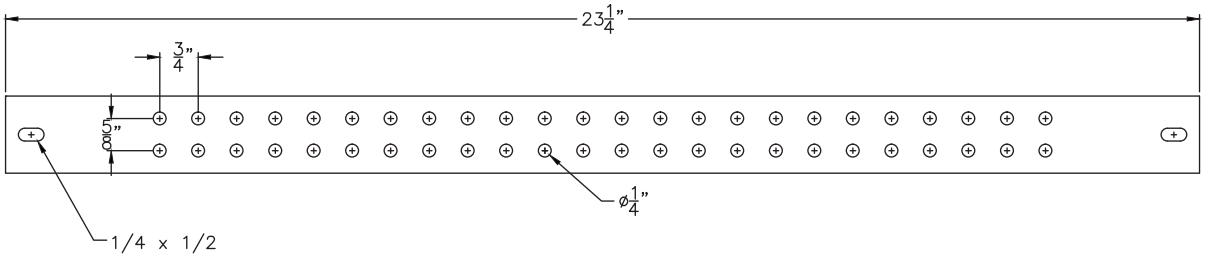
Horizontal Bars Only

Part No.	Bar Size	Approx. Each Wt. (lbs.)
RGBH14119.25	1/4" x 1" x 19-1/4"	2
RGBH14123.25	1/4" x 1" x 23-1/4"	3
RGBH14135.25	1/4" x 1" x 35-1/4"	4

• Above bars include 3" bar splice plate.

RGBH141.523.25A Pictured

Listed 467



Horizontal Bars Only

Part No.	Bar Size	Approx. Each Wt. (lbs.)
RGBH141.519.25A	1/4" x 1-1/2" x 19-1/4"	3
RGBH141.523.25A	1/4" x 1-1/2" x 23-1/4"	4
RGBH141.535.25A	1/4" x 1-1/2" x 35-1/4"	5

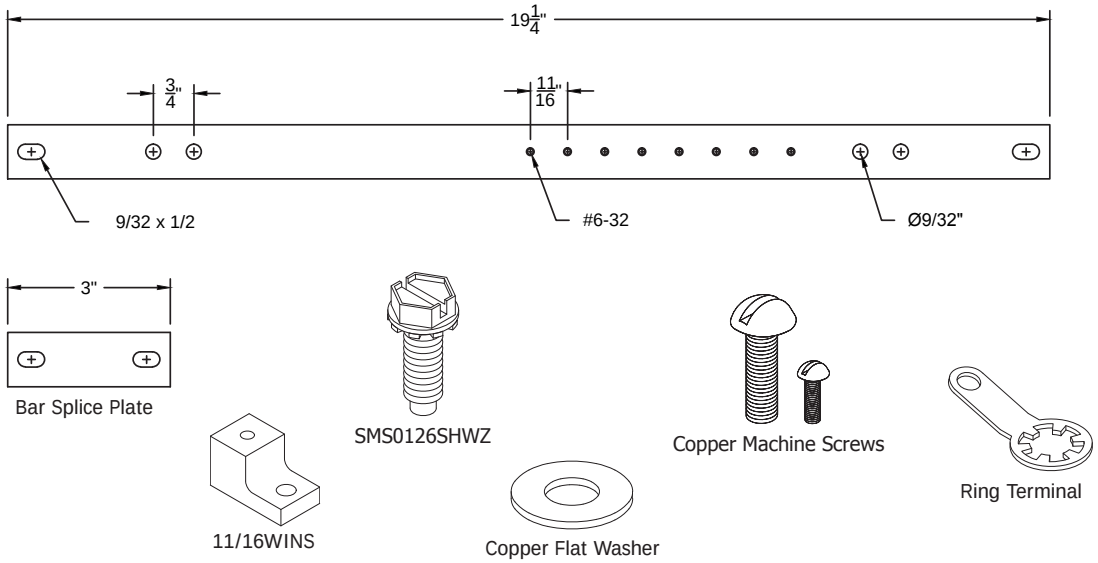
• Accommodates "A" spaced two hole lugs.

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.

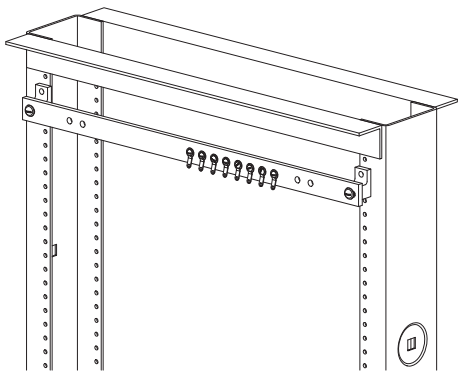
RGBHKIT14119.25 Pictured

Listed 467



Horizontal Kits

Part No.	Bar Size	Approx. Each Wt. (lbs.)
RGBHKIT14119.25	1/4" x 1" x 19-1/4"	1-3/4
RGBHKIT14123.25	1/4" x 1" x 23-1/4"	4
RGBHKIT14135.25	1/4" x 1" x 35-1/4"	5



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 flashed brass screw
(2) #12 copper flat washer
(8) #6-32 x 1/4" copper flashed brass screw
(8) #6 ring terminal

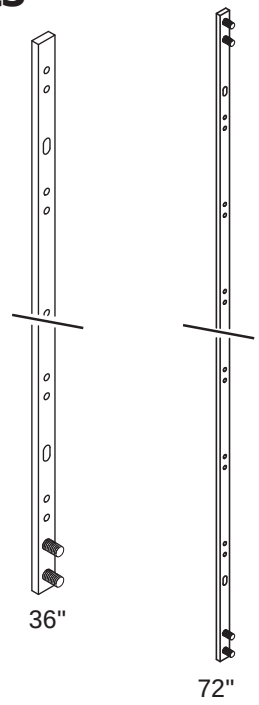
Telecommunications Equipment Rack Grounding Busbars & Kits

Vertical Bars

Part No.	Bar Size	Approx. Each Wt. (lbs.)
RGBV145836A	1/4" x 5/8" x 36"	2
RGBV145872A	1/4" x 5/8" x 72"	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 2 PEM studs 1" on center at one end for ground conductor connection.
- 72" bar has 4 PEM studs (two at each end) 1" on center for ground conductor connections.

Listed 467

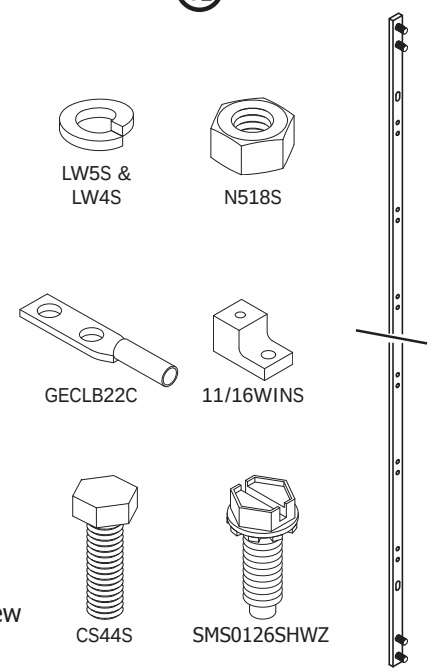


Vertical Kits

Part No.	Bar Size	Approx. Each Wt. (lbs.)
RGBVKIT145836A	1/4" x 5/8" x 36"	3-1/2
RGBVKIT145872A	1/4" x 5/8" x 72"	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 2 PEM studs 1" on center at one end for ground conductor connection.
- 72" bar has 4 PEM studs (two at each end) 1" on center for ground conductor connections.

Listed 467

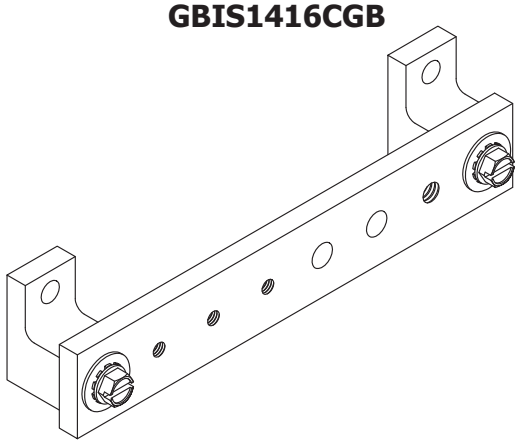


Kit Includes:

(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

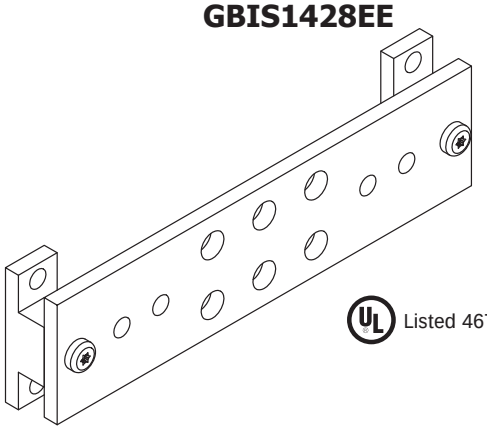
Telco Ground Bars

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 1/2 pound.

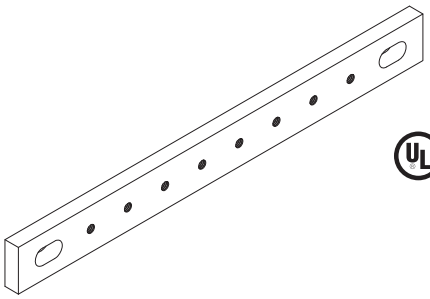
GBIS1428EE



Listed 467

- 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 1-1/4 pounds.

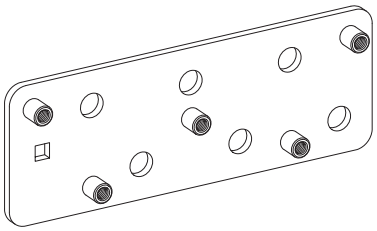
GB14.757.5GBE



Listed 467

- 1/4" x 3/4" x 7-1/2" electrolytic tough pitch copper alloy 110 bar.
- (8) 6-32 tapped holes designed to fit one hole lugs.
- (2) .281 x 1/2" slots, 6-3/8" on-center for mounting.
- Approximate weight is 1/2 pound.

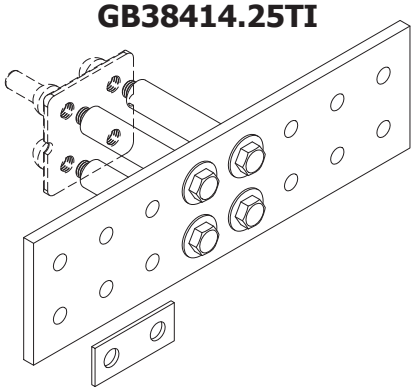
TGB1825.5CCS



- 1/8” x 2” x 5-1/2” electrolytic tough copper alloy 110 bar.
- (6) 11-32 holes used with 5/16” hardware.
- (5) 10-32 clinch nuts.
- Approximate weight is 1/2 pound.

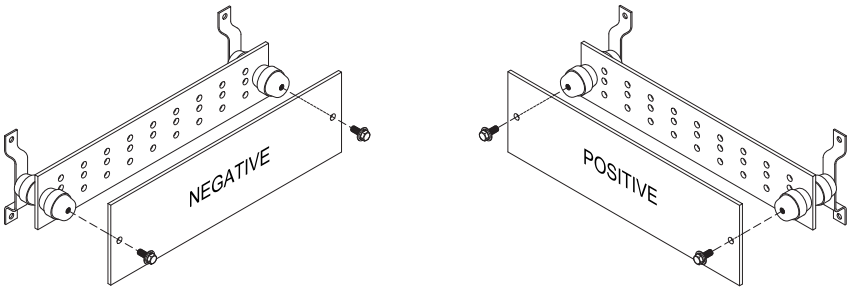
Telco Ground Bars

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 and copper spacers.
- Designed to be used in conjunction with exothermic ground plate XGP3.25/3.254/0 (not included). See page 316 for ground plates.
- Approximate weight is 7-1/2 pounds.

BATTERYCONNKIT

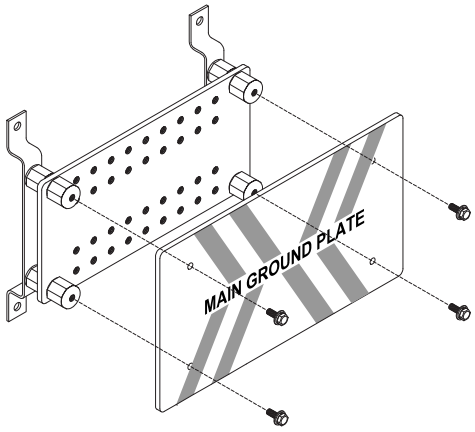


- (2) 1/4" x 4" x 20" electrolytic tough pitch copper alloy 110 bars.
- Each bar has (27) 7/16" punched holes designed to accommodate "B" and "C" spaced two hole lugs (3/4" and 1" on center).
- Each bar comes with a 1/4" thick plexiglass cover with 1" high red lettering.
- Approximate weight for complete kit is 18 pounds.

FAA Style Ground Bars

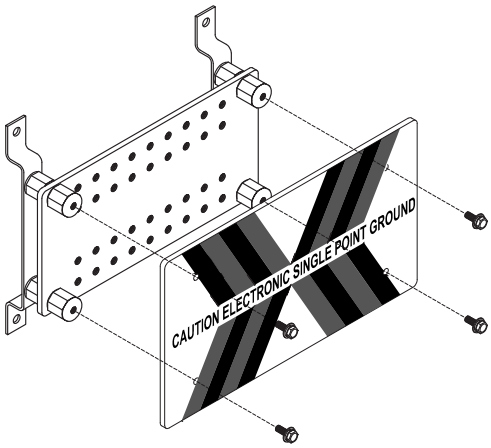
GBIP14612MGPFAA3
Main Ground Plate

1/2" high black lettering and green & clear striping are applied to plexiglass cover.



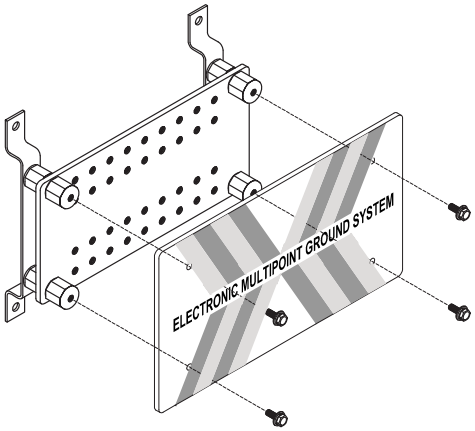
GBIP14612CESPGFAA
Caution Electronic Single Point Ground

1/2" high black lettering and green & yellow striping are applied to plexiglass cover.



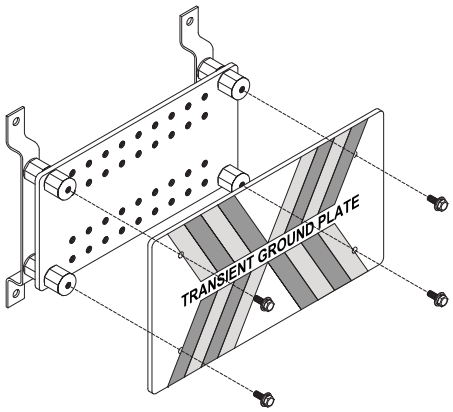
GBIP14612EMGSFAA
Electronic Multipoint Ground System

1/2" high black lettering and green & orange striping are applied to plexiglass cover.



GBIP14612TGPFAA
Transient Ground Plate

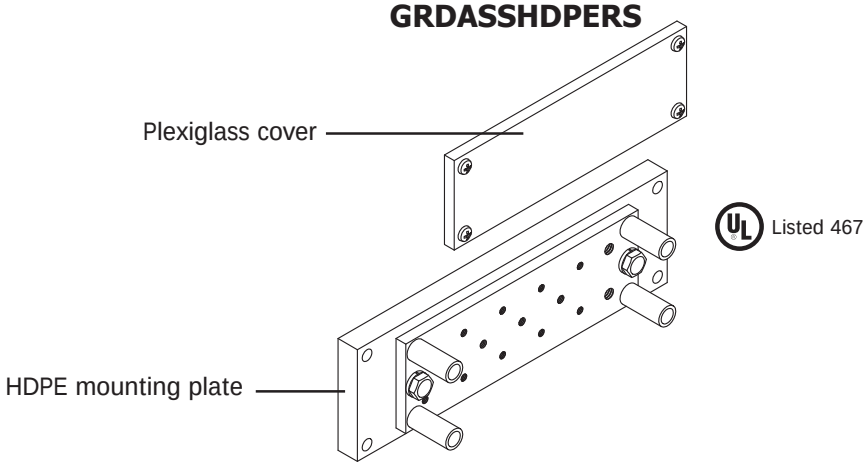
1/2" high black lettering and green & red striping are applied to plexiglass cover.



- 1/4" x 6" x 12" electrolytic tough pitch copper alloy 110 bar.
- Includes insulators, mounting brackets and plexiglass covers (ships partially assembled).
- 18 sets of 3/8-16 tapped holes 1" on center.
- Approximate weight is 8 pounds.

FAA Style Ground Bars

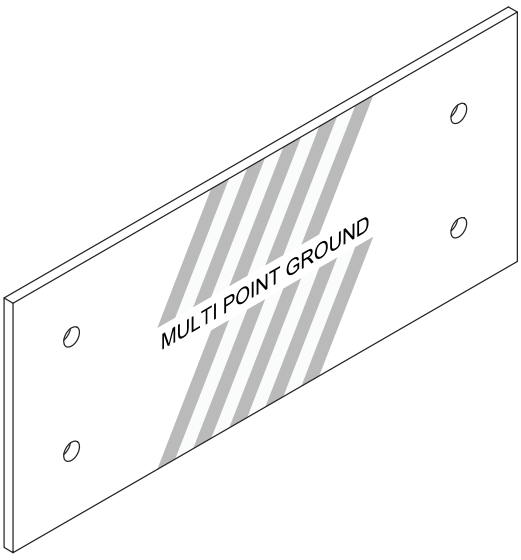
GRDASSHDPERS

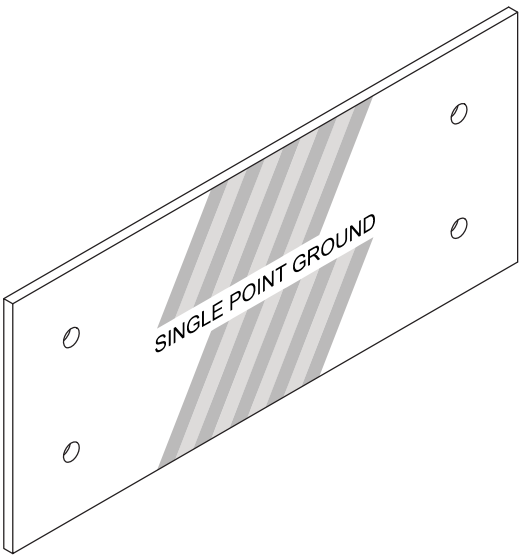


- 1/4" x 2" x 6" electrolytic tough pitch copper alloy 110 bar.
- (10) 8-32 tapped holes, (4) 10-32 tapped holes and (2) 1/4-20 tapped holes.
- 1/4" thick plexiglass cover.
- 1/2" x 2.5" x 8" HDPE mounting plate.
- Approximate weight is 5 pounds.

FAA Style Plexiglass Covers

All ground bars are available with lettered plexiglass covers.
Minimum lettering height is 3/8". Lettering available in several different colors.
Standard cover thickness is 1/4". Other thicknesses available.
Please contact our factory with your special needs.

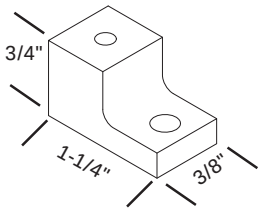




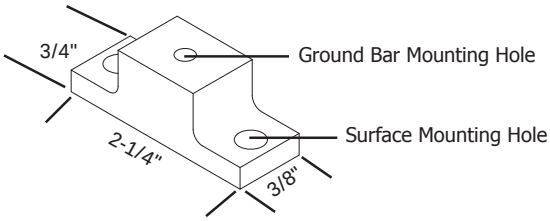
Standoff Insulators - White

Manufactured from Delrin material.

11/16WINS



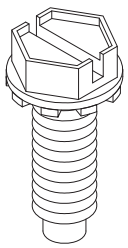
7/8WINS

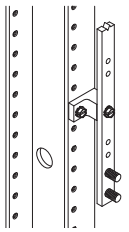


Part No.	Box Qty.	Approx. Box Wt. (lbs.)
11/16WINS	50	1-1/4
7/8WINS	20	1-1/4

- 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



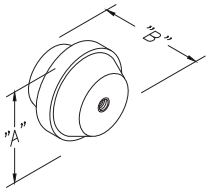


Part No.	Box Qty.	Approx. Box Wt. (lbs.)
SMS0126SHWZ-50	50	1

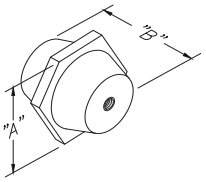
- #12-24 x 5/8" zinc plated thread forming hex washer head screw with external washer.
- Used with white standoff insulators (11/16WINS & 7/8WINS).
- Removes paint on a 12-24 threaded rack hole.

Standoff Insulators - Red

Hexagon



Round



Octagon

Manufactured from glass reinforced thermoset polyester.

Part No.	"A"	"B"	Shape	Thread Size	Voltage Rating	Tensile Strength (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
1100A1	1"	1"	Hex	1/4 - 20 x 1/4 AL	600	1200	25	1-1/2
4150S2	2"	1-1/2"	Oct	1/4 - 20 x 1/2 STL	1500	3000 - 4500	20	4-1/2
R4150S3	1-3/4"	1-1/2"	Round	5/16 - 18 x 1/2 STL	1500	2500 - 2700	20	5-1/2
R4150A4	1-3/4"	1-7/8"	Round	3/8 - 16 x 3/8 AL	2000	2500 - 2700	20	5-1/2
R4200S5	1-3/4"	2"	Round	3/8 - 16 x 5/8 STL	2500	2500 - 2700	20	6-3/4
4200S6	2"	2"	Oct	1/2 - 13 x 5/8 STL	2500	3000 - 4500	20	8
5250A5	2-1/2"	2-1/2"	Oct	3/8 - 16 x 5/8 AL	3200	5000 - 5700	10	4-1/2
5263A8	2-1/2"	2-5/8"	Oct	5/8 - 11 x 3/4 AL	3400	5000 - 5700	10	4-3/4

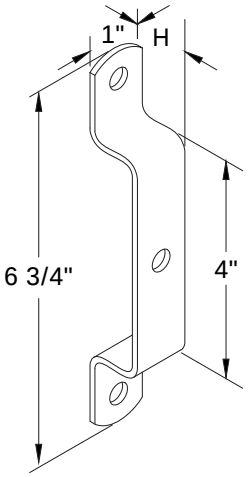
Other sizes available. Contact our factory for special requests.

Mounting Brackets

Wall Mount

Part No.	Mounting Hole Size	"H"	Material	Heavy Duty	Box Qty.	Approx. Box Wt. (lbs.)
WBKT1	7/16"	1"	SS	No	10	3
WBKT1HD	5/8"	1"	Z/P Steel	Yes	10	8
WBKT1HDS	5/8"	1"	SS	Yes	10	8
WBKT2	7/16"	2"	SS	No	10	4
WBKT3	7/16"	3"	SS	No	10	4
WBKT4	7/16"	4"	SS	No	10	5

- Manufactured from 304 series stainless steel or zinc plated steel.
- Special brackets available upon request.



WBKT1

NOTES:
- See Section 1.12 on page 141 for hardware.

Mounting Brackets

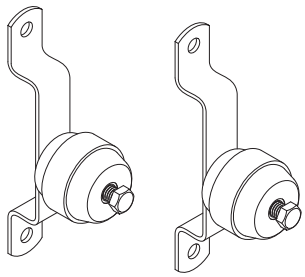
Wall Mount Kit

Part No.	Mounting Hole Size	"H"	Material	Heavy Duty	Box Qty.	Approx. Box Wt. (lbs.)
WBKT1KIT	7/16"	1"	SS	No	5	5

- Manufactured from 304 series stainless steel or zinc plated steel.
- Special brackets available upon request.

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 split lock washer



WBKT1KIT

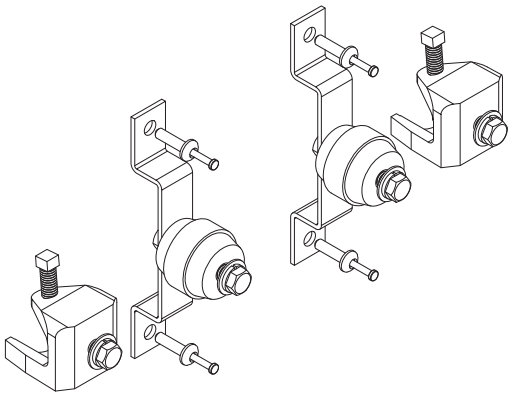
Universal Busbar Mounting Kit

Part No.	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GBUKIT	2-1/4	10	22-1/2

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

Kit Includes:

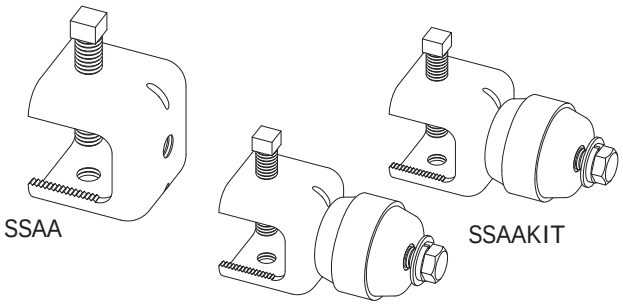
(2) WBKT1: stainless steel ground bar bracket (Shelter)
(2) MBC3816: Malleable iron angle adapters (Tower)
  • Will accommodate up to 7/8" thick material.
(2) R4150A4: round insulator
(4) 280: 1/4" x 1" drive pin
(2) CS65S: 3/8"-16 x 5/8" stainless steel hex head cap screw
(2) CS66S: 3/8"-16 x 3/4" staniless 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.	Box Qty.	Approx. Box Wt. (lbs.)
SSAA	10	5
SSAAKIT	5	8

- 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.



"Do Not Disconnect" Tag

Part No.	Material	Box Qty.	Approx. Each Wt. (lbs.)
GRNTAGDND	Brass	EA	1/4

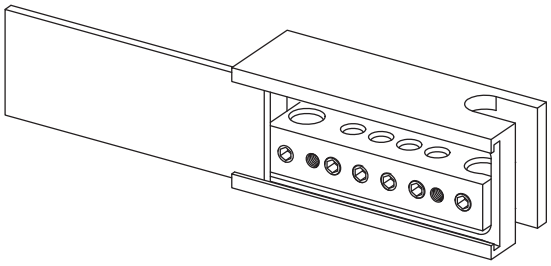
- Used in Data Center and In-Building Telecommunications Grounding Systems to mark both ends of grounding/bonding conductors.
- 2" diameter brass tag with 1/2" high black filled lettering.
- Made from corrosion resistant brass.
- Has a round hole for mounting, screwing or wire tying into position.

Network Building Ground Tag

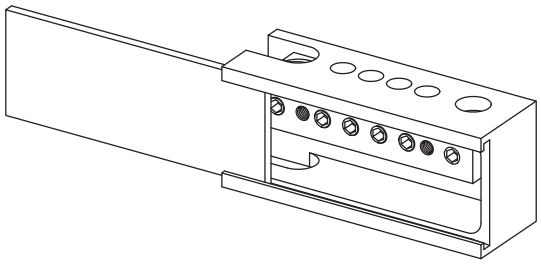
Part No.	Material	Box Qty.	Approx. Box Wt. (lbs.)
GRNTAG607PK10	Plastic	10	1/2

- 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.	Box Qty.	Approx. Each Wt. (lbs.)
IBTD	EA	3/4

- **I**ntersystem **B**onding **T**ermination **D**evice
- 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 2011 Article 250.94 Bonding For Other Systems

Section 1.4

Ground Bus Systems

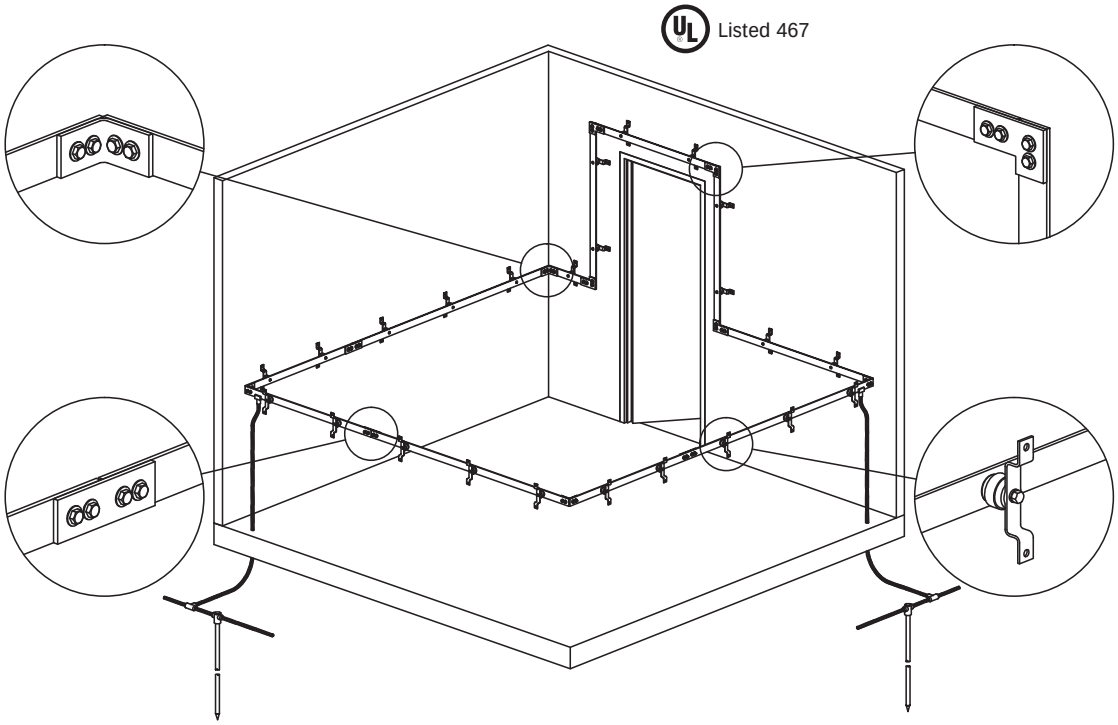
Index

Introduction

Custom Ground Bus Systems

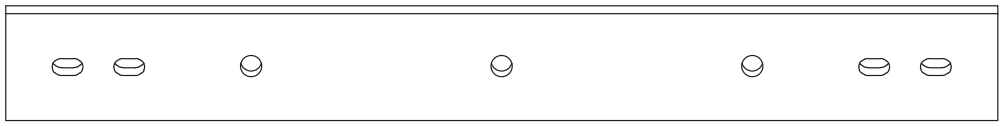
Harger Ground Bus Systems offer flexibility, ease of design and superior installation characteristics. A variety of elbows, insulators, splice plates and bars ensure that custom design specifications are met. Harger's technical support staff stands ready to assist you with your design criteria.

Some examples of Ground Bus System applications are: clean rooms for chemical storage, ammunitions, paints & inks, testing laboratories and pharmaceuticals.



Ground Bus Numbering System

Simply follow the example outlined below to specify the type and size of the ground bus you need.
The following example is a copper ground bus that is 1/4" thick, 2" wide and 12' long utilizing hole pattern "K".



CB 14 2 144 K

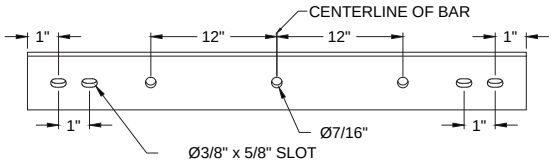
Listed 467

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

Copper Ground Busbars

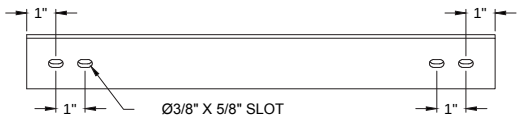
Part No.	Thickness	Width	Length	Hole Pattern	Approx Each Wt. (lbs.)
CB141144K CB141144S CB141144N	1/4"	1"	144"	K S N	12
CB141.5144K CB141.5144S CB141.5144N	1/4"	1-1/2"	144"	K S N	18
CB142144K CB142144S CB142144N	1/4"	2"	144"	K S N	24

• Other sizes available. Please contact factory for more information.

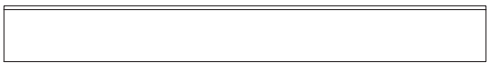


"K"

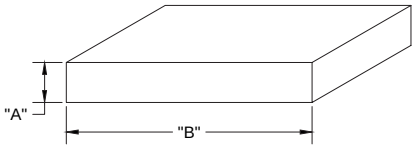
These hole patterns are offered as standard part numbers. However, Harger stands ready to custom design any hole pattern you require.



"S"



"N"



Ground Bus Sizes

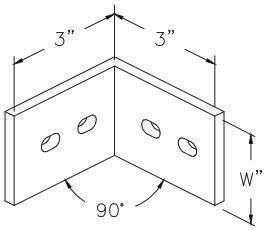
DIMEN. "A" INCHES	DIMEN. "B" INCHES	DIMEN. "A" INCHES	DIMEN. "B" INCHES	DIMEN. "A" INCHES	DIMEN. "B" INCHES	DIMEN. "A" INCHES	DIMEN. "B" INCHES
1/8	3/8	1/4	1	3/8	1-1/2	1/2	4
1/8	1/2	1/4	1-1/4	3/8	2	1/2	5
1/8	5/8	1/4	1-1/2	3/8	2-1/2	1/2	6
1/8	3/4	1/4	1-3/4	3/8	3	1/2	8
1/8	7/8	1/4	2	3/8	3-1/2	3/4	1
1/8	1	1/4	2-1/2	3/8	4	3/4	1-1/4
1/8	1-1/4	1/4	3	3/8	5	3/4	1-1/2
1/8	1-1/2	1/4	3-1/2	3/8	6	3/4	2
1/8	1-3/4	1/4	4	1/2	3/4	3/4	2-1/2
1/8	2	1/4	5	1/2	1	3/4	3
1/8	2-1/2	1/4	6	1/2	1-1/4	3/4	3-1/2
1/8	3	1/4	8	1/2	1-1/2	3/4	4
1/8	4	3/8	1/2	1/2	1-3/4	3/4	5
1/8	6	3/8	5/8	1/2	2	3/4	6
1/4	1/2	3/8	3/4	1/2	2-1/2	3/4	7-3/4
1/4	5/8	3/8	1	1/2	3	3/4	8
1/4	3/4	3/8	1-1/4	1/2	3-1/2		

Maximum length per bar is 12'-0". Bus is available in both copper and aluminum.

Elbows & Splicers with Kits

90° Elbows

Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141EL90	No	1/4"	1"	1/2
CU141EL90KIT	Yes	1/4"	1"	3/4
CU141.5EL90	No	1/4"	1-1/2"	3/4
CU141.5EL90KIT	Yes	1/4"	1-1/2"	1
CU142EL90	No	1/4"	2"	1
CU142EL90KIT	Yes	1/4"	2"	1-1/4

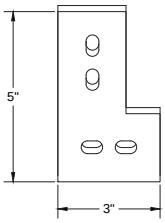


Listed 467

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"	1-1/4

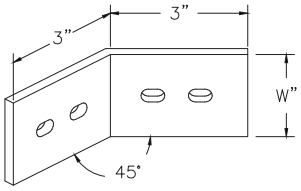
• Used for 1/4" x 2" bar stock.



Listed 467

45° Elbows

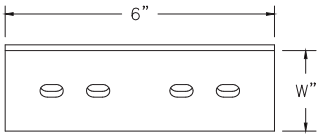
Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141EL45	No	1/4"	1"	1/2
CU141EL45KIT	Yes	1/4"	1"	3/4
CU141.5EL45	No	1/4"	1-1/2"	3/4
CU141.5EL45KIT	Yes	1/4"	1-1/2"	1
CU142EL45	No	1/4"	2"	1
CU142EL45KIT	Yes	1/4"	2"	1-1/4



Listed 467

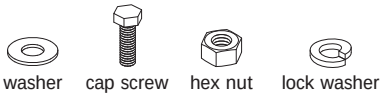
Splice Plates

Part No.	Kit*	Thickness	Width	Approx. Each Wt. (lbs.)
CU141SPL	No	1/4"	1"	1/2
CU141SPLKIT	Yes	1/4"	1"	3/4
CU141.5SPL	No	1/4"	1-1/2"	3/4
CU141.5SPLKIT	Yes	1/4"	1-1/2"	1
CU142SPL	No	1/4"	2"	1
CU142SPLKIT	Yes	1/4"	2"	1-1/4



Listed 467

***Kit Includes:**
(1) Elbow or Splice Plate
(4) CS68S: 3/8"-16x1" SS hex head cap screw
(8) W6S: 3/8"-18 SS flat washer
(4) LW6S: 3/8"-16 SS lock washer
(4) N616S: 3/8"-16 SS hex nut

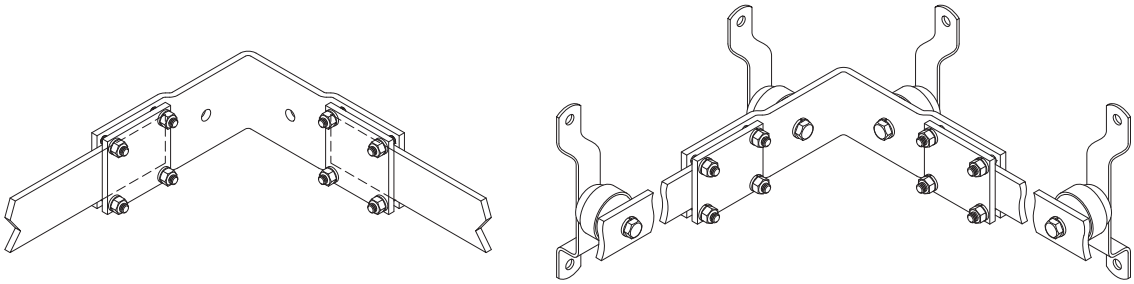


NOTES:
- Slotted hole size is 3/8" x 5/8" spaced 1" on center.
- Other sizes available. Please contact factory for more information.

"Sandwich" Style Elbow & Splicers

No Drilling Required

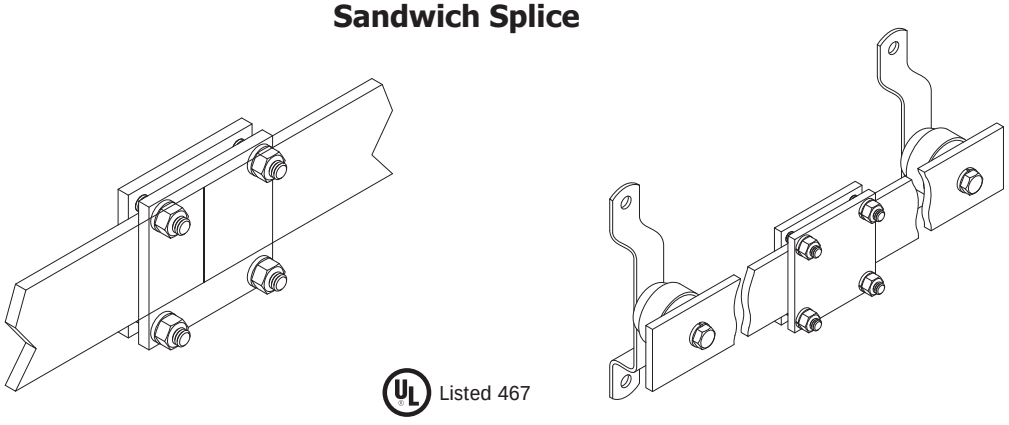
90° Sandwich Splice



Listed 467

Part No.	Thickness	Fits Bar Width	Interior or Exterior Bend	Approx. Each Wt. (lbs.)
SSCUEL90141INT	1/4"	1"	Interior	4
SSCUEL90141EXT	1/4"	1"	Exterior	4
SSCUEL90141.5INT	1/4"	1-1/2"	Interior	5
SSCUEL90141.5EXT	1/4"	1-1/2"	Exterior	5
SSCUEL90142INT	1/4"	2"	Interior	6
SSCUEL90142EXT	1/4"	2"	Exterior	6

Sandwich Splice



Listed 467

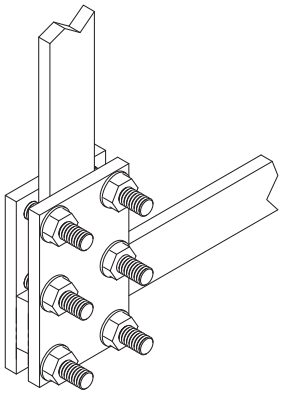
Part No.	Thickness	Fits Bar Width	Approx. Each Wt. (lbs.)
SSCUPL141	1/4"	1"	1/2
SSCUPL141.5	1/4"	1-1/2"	1
SSCUPL142	1/4"	2"	1

Other sizes available. Please contact factory for more information.

"Sandwich" Style Elbows & Splicers

No Drilling Required

Splice Plates



Listed 467

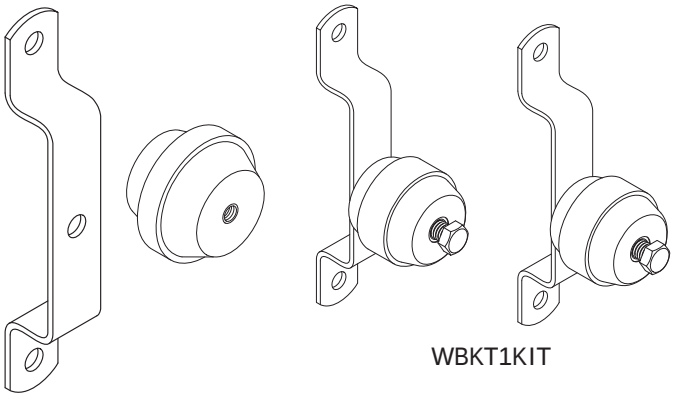
Part No.	Thickness	Fits Bar Width	Approx. Each Wt. (lbs.)
SSCUPLHV141	1/4"	1"	1/2
SSCUPLHV141.5	1/4"	1-1/2"	1
SSCUPLHV142	1/4"	2"	1-1/2

Other sizes available. Please contact factory for more information.

Insulators & Mounting Brackets

Stand-off insulators, mounting brackets and hardware are all provided by Harger. Insulators and mounting brackets are found on pages 74 & 75.
The hardware is in Section 1.12, page 141.

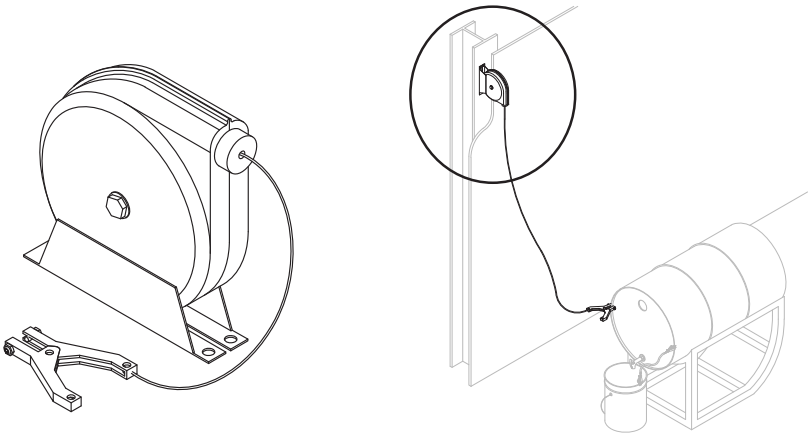
To provide proper support, bars should be mounted every 2 to 4 feet.



WBKT1KIT

Static Ground Kits

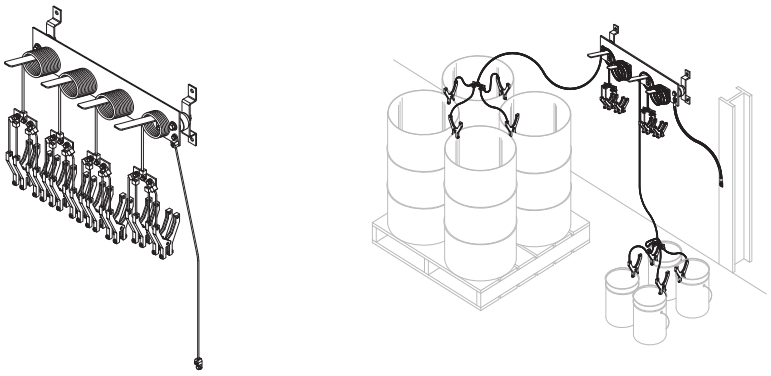
Static Ground Reel 20' with Clamp



Part No.	Approx. Each Wt. (lbs.)
SGR20	15

- Static ground reel with 20' retractable 3/32" diameter galvanized steel bonding conductor.
- Includes die cast aluminum plier-type clamp with two stainless steel points.
- Approximate 1" maximum jaw opening.

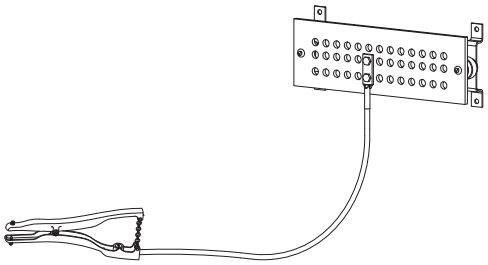
Barrel Grounding Assembly



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

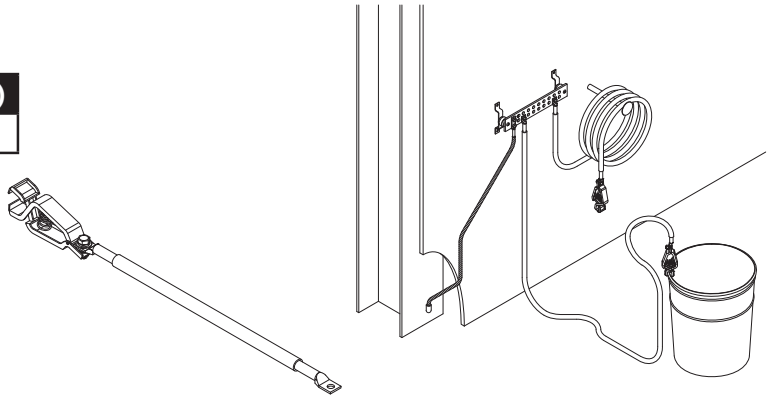


Harger manufactures a variety of static ground kits. Please contact factory for more information.

Pail Ground Strap

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

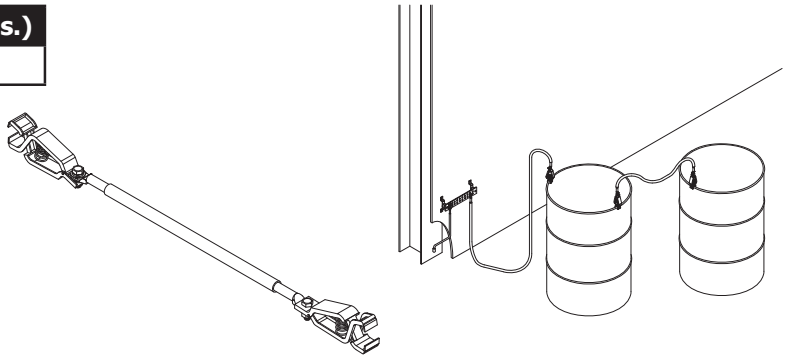
- 10' long, temporary static bond strap manufactured from 2/0 superflexible, insulated conductor.
- Comes with a 200 Amp copper ground clamp with 1-5/8" maximum jaw opening and a compression lug for 3/8" hardware.



Barrel Bond Strap

Part No.	Approx. Each Wt. (lbs.)
GJ4/0WC36CE	5-1/4

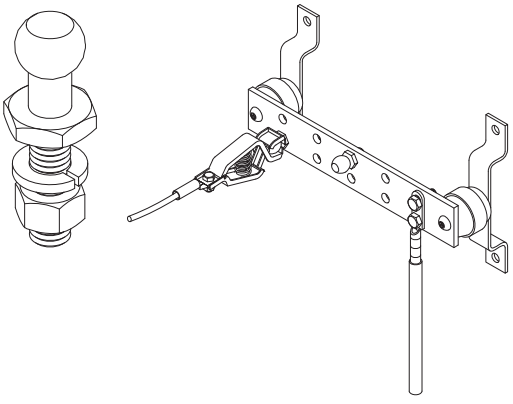
- 36" long, temporary static bond strap manufactured from 4/0 superflexible, insulated conductor.
- Comes with two 200 Amp copper ground clamps with 1-5/8" maximum jaw opening.



Brass Ground Stud

Part No.	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GRDSTD1.25	1/4	25	6-1/4

- Can be attached to ground bar or to steel frame of tank cars or trucks.
- 1-1/4" long 3/8-16 threaded stud with nut and lock washer.
- Used for static grounding.



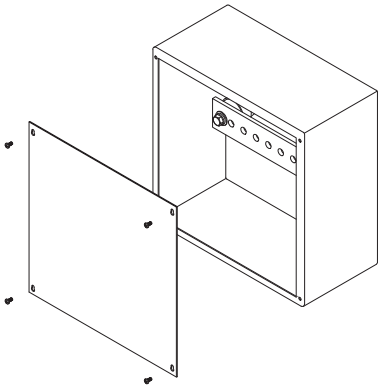
Section 1.5

Ground Boxes

Index

NEMA Type 1 Steel Enclosures

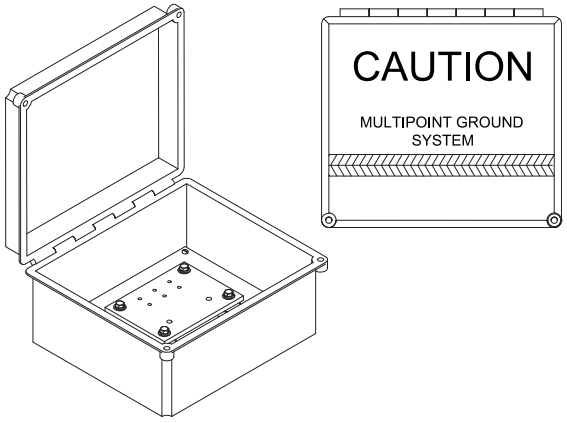
Part No.	Size H	Size W	Size D	Bar Width	Number of Holes	Approx. Each Wt. (lbs.)
GBX886	8"	8"	6"	2"	3	7
GBX10106	10"	10"	6"	2"	6	10
GBX12126	12"	12"	6"	2"	8	19
GBX18186	18"	18"	6"	4"	13	20
GBX24246	24"	24"	6"	4"	19	34



- NEMA Type 1 gray steel boxes with screw cover.
- Standard bar has "H" hole pattern (see page 51).
- "H" hole pattern is a single row of 7/16" holes spaced every 1 inch.
- Two 3/8" x 1-7/8" insulators.
- Other sizes and types available. Please contact factory for more information.

NEMA Type 4 Fiberglass Enclosures

Part No.	Size H	Size W	Size D	Number of Holes	Approx. Each Wt. (lbs.)
ES240	12"	10"	6"	8	22



- 3/8" x 4" x 6" copper ground bar with 3 sets of 1/4" holes spaced 1" on center.
- 3/4" x 9-1/2" x 11-1/2" white plywood backing panel.
- Four 3/8" x 1-1/2" insulators.
- Front cover stenciled with 1" high black letters and 3/8" high black letters.
- Striping is 1/2" high green and orange.
- Other sizes and types available. Please contact factory for more information.

Section 1.6

UL Listed
Supplementary Bonding Grids

(also known as Signal Reference Grids)

&
Prefabricated Copper Ground Mesh

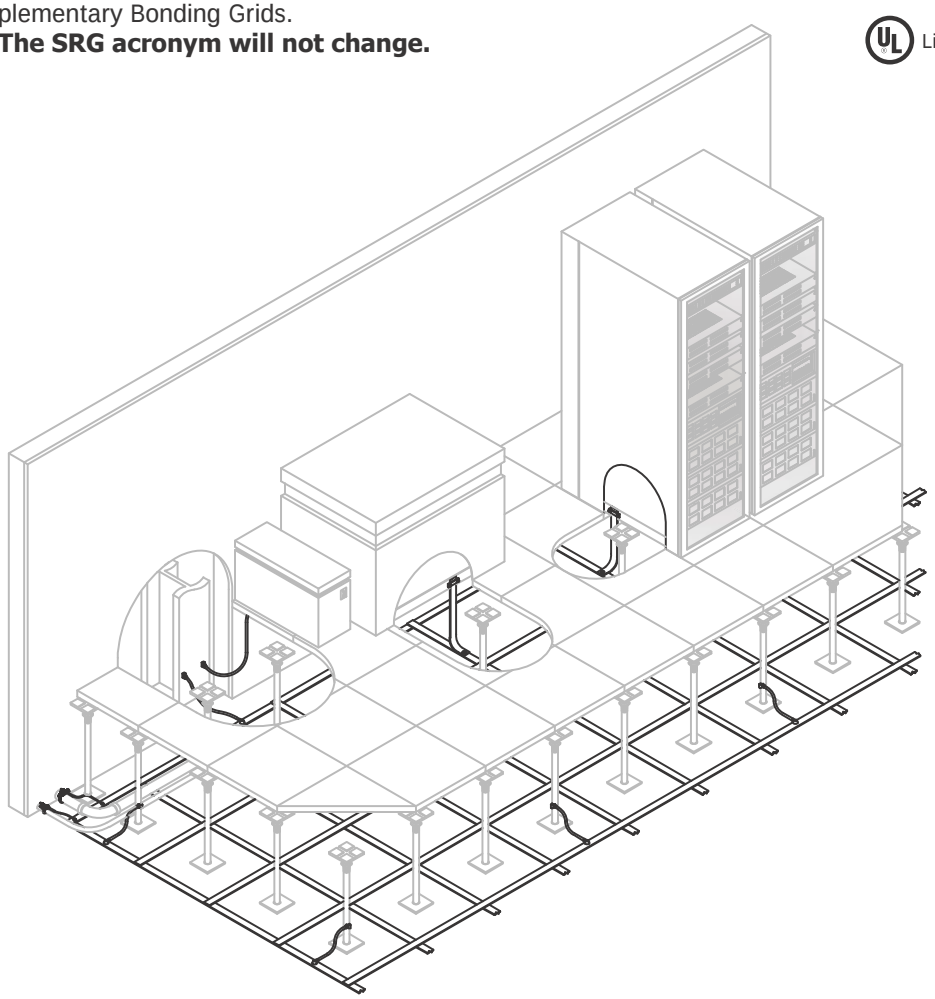
Index

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.

Note: The SRG acronym will not change.

Listed 467



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 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

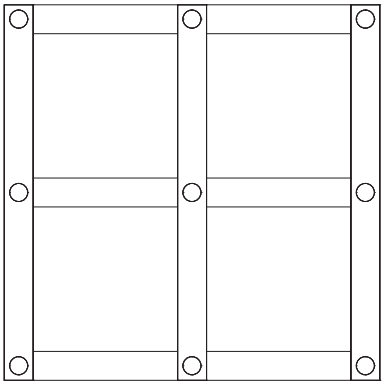
Harger's Flat Strip Supplementary Bonding Grids are manufactured from 2" wide x 26 gauge soft copper strip. They are welded together forming a 2' x 2' pattern. Rolls of SRG range from 2' to 18' wide and the weight per roll is usually limited to a maximum of 250 pounds. The following page offers a design 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.
Note: The SRG acronym will not change.

APPLICATION NOTES:

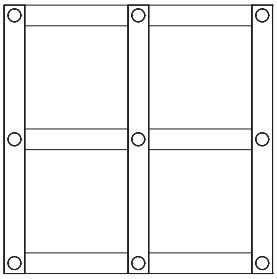
The grid lies directly on the subfloor that supports the raised floor. It may or may not be glued or fastened down. "Power and data cables lay on the grid. The advantage of this geometry is that, due to decreased open loop area, the coupling of radiated energy from far-field phenomena into the cables 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."*

*2005 IEEE Std. 1100

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)

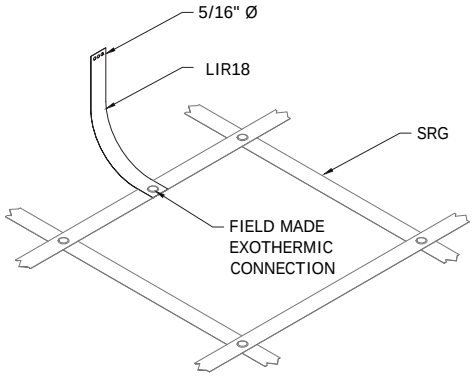
NOTES:
- 2" x .016" Copper Strip is used unless specified otherwise.
- Meets requirements of 2005 IEEE Std. 1100.

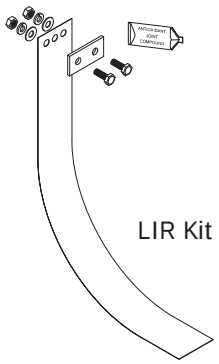
Standard SRG Sizes

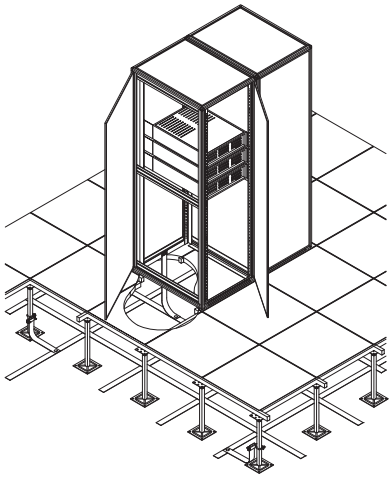
Part No.	Description	Approx. Each Wt. (lbs.)
SRG105024	10' x 50', 24" O.C. Spacing	90
SRG125024	12' x 50', 24" O.C. Spacing	98

• Commonly stocked.

Low Impedance Risers







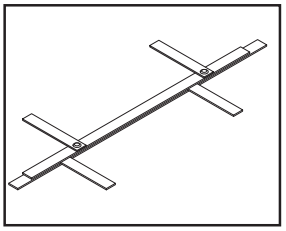
Part No.	Material	Length	Riser or Kit
LIR18	2" x .016" Flat Copper	18"	Riser
LIR18KIT	2" x .016" Flat Copper	18"	Kit
LIR24	2" x .016" Flat Copper	24"	Riser
LIR24KIT	2" x .016" Flat Copper	24"	Kit
LIR36	2" x .016" Flat Copper	36"	Riser
LIR36KIT	2" x .016" Flat Copper	36"	Kit
LIR72	2" x .016" Flat Copper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

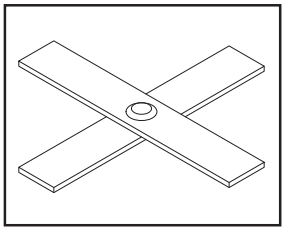
- Kit includes all necessary hardware.
- Use mold SRG2016K to weld LIR to SRG.

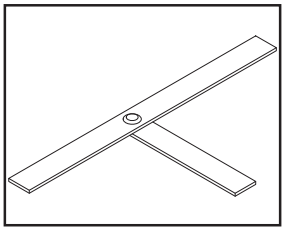
SRG to SRG Connections

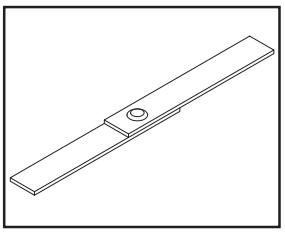
Mold Part No.	Flat Strip	Weld Metal		Handle Clamp
		UltraShot	NUWTUBE	
SRG2016K	2" x .016"	US32	NUWTUBE32	MH1

- 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 USSXKIT (page 276) is required to convert standard UltraShot molds into low smoke-no flame molds using UltraShot weld metal only.


Adjacent SRG Mats Welded Together

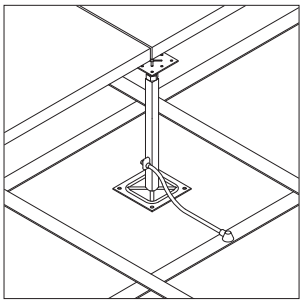

Cross


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 94).

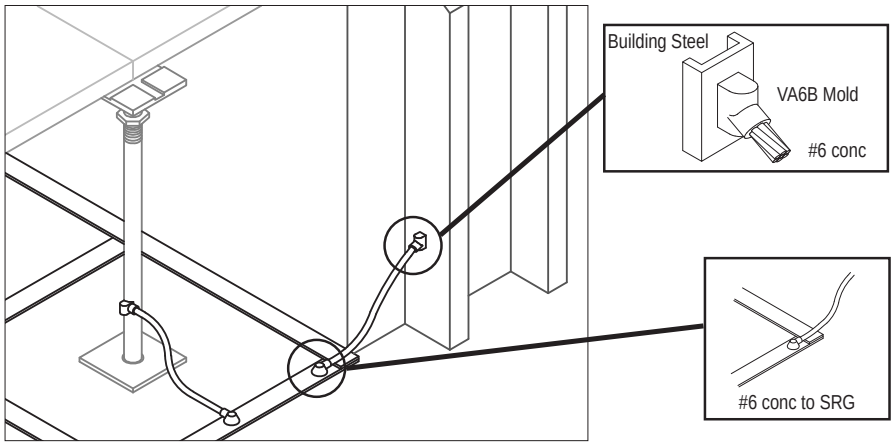


Exothermically Welded Pedestal Connections

Mold Part No.	Connection	Weld Metal		Handle Clamp
		UltraShot	NUWTUBE	
VHO61SQMX	#6 Conc. to 1" Sq. Pedestal	US25	NUWTUBE25	MH4
BCF61.5016B	#6 Conc. to SRG	US25	NUWTUBE25	MH1

- For low smoke requirements, a USSXKIT (page 276) is required to convert standard UltraShot molds into low smoke-no flame 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		Handle Clamp
		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 USSXKIT (page 276) is required to convert standard UltraShot molds into low smoke-no flame molds using UltraShot weld metal only.

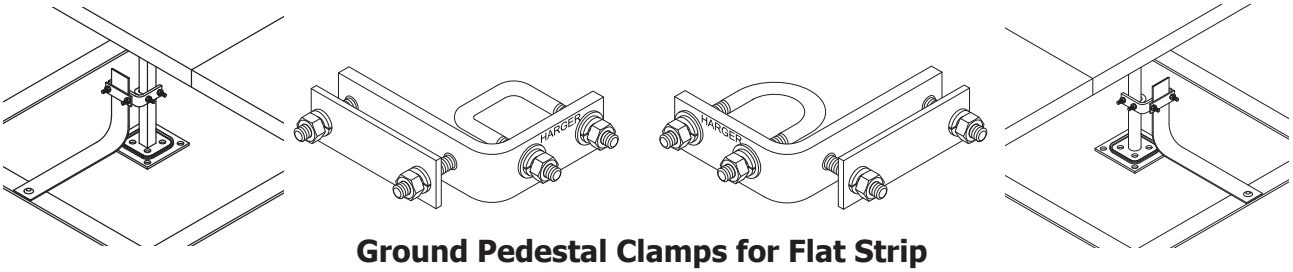
Round-wire Supplementary Bonding Grid

"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". (2005 IEEE Std. 1100)

Harger offers a variety of ground pedestal clamps and conductors to achieve these objectives. Conductors can be found in Section 1.1, page 11. Signal Reference Grids (SRG) are also known as Supplementary Bonding Grids.

Note: The SRG acronym will not change.

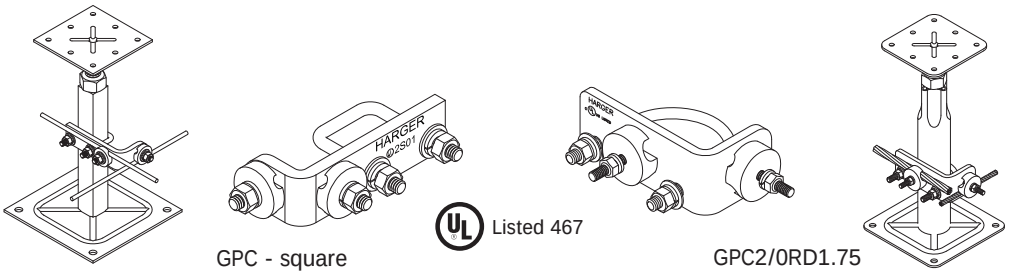
Ground Pedestal Clamps & Bonding Clamps



Ground Pedestal Clamps for Flat Strip

Part No.	U-Bolt Type	Pedestal Size	Conductor Size	Box Qty.	Approx. Box Wt. (lbs.)
GPC2FSSQ	Square	1"	2" Flat Strip	5	4
GPC2FSRD	Round	1"	2" Flat Strip	5	4

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



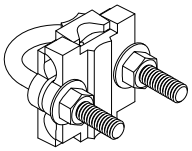
GPC - square

GPC2/0RD1.75

Part No.	U-Bolt Type	Pedestal Size	Conductor Size (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
GPC6SQ	Square	1" (1-1/8" OD)	#6	5	3-1/2
GPC6RD	Round	1" (1-1/8" OD)	#6	5	3-1/2
GPC4SQ	Square	1" (1-1/8" OD)	#4	5	3-1/2
GPC4RD	Round	1" (1-1/8" OD)	#4	5	3-1/2
GPC2SQ	Square	1" (1-1/8" OD)	#2	5	3-1/2
GPC2RD	Round	1" (1-1/8" OD)	#2	5	3-1/2
GPC2/0RD1.75	Round	1-1/8" - 1-3/4"	2/0 & #6	5	7-1/2

- Accommodates cross runs without adding an additional connector. Accommodates 4 conductors in total.
- Electro-tin plated copper.
- Includes stainless steel hardware.
- Other sizes available. Please contact factory for more information.

Ground Pedestal Clamps & Bonding Clamps



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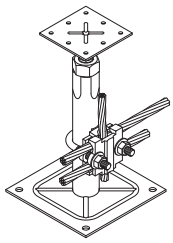
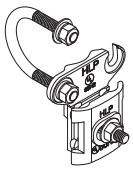


Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC.5/.75	Tinned Bronze	.5" - 1"	.375" - 1"	5	2-1/2

- 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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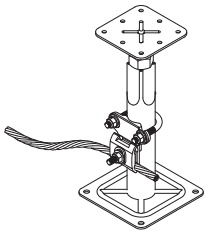
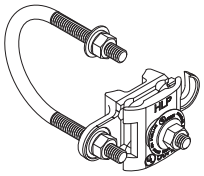


Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC1/1.25	Tinned Bronze	1" - 1.625"	.75" - 1.7"	5	3

- Electro-tin plated bronze includes stainless steel hardware.
- Accommodates 2 conductors from #6 AWG up to 250 MCM.
- Fits round pedestal outside diameter range .75" - 1.7".



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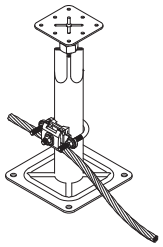


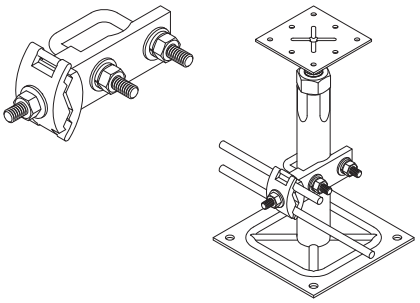
Part No.	Material	Pedestal Diameter Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC1.5/2	Tinned Bronze	1.5" - 2.375"	1" - 2.4"	5	3-3/4

- 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" - 2.4".

Ground Pedestal Clamps & Bonding Clamps

Part No.	Conductor Size (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
GP1MCI	#6 Sol. thru 2/0 Str.	5	2-1/2
TGP1MCI	#6 Sol. thru 2/0 Str.	5	2-1/2

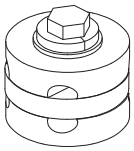
- Heavy duty bronze clamp includes stainless steel hardware.
- Available electro-tin plated. When ordering, add prefix T to part number.
- Fits both round and square pedestal legs up to 1-1/8" outside diameter.



Computer Room Ground Clamps

Part No.	Conductor Size (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
CRGC6	#6	25	4
CRGC4	#4	10	5
CRGC2	#2	10	5

- Used when welded connections are not feasible.
- Unique 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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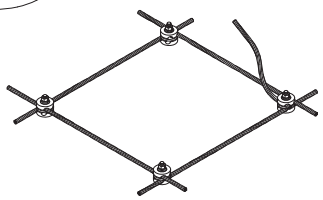


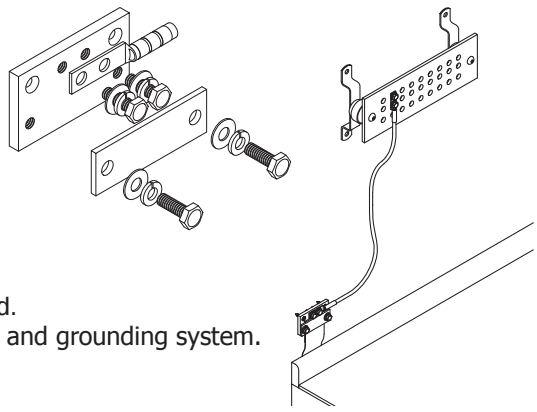
Static Floor Bonding Clamp Kit

Part No.	Box Qty.	Approx. Box Wt. (lbs.)
SFBC3KIT	1	1-1/4

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

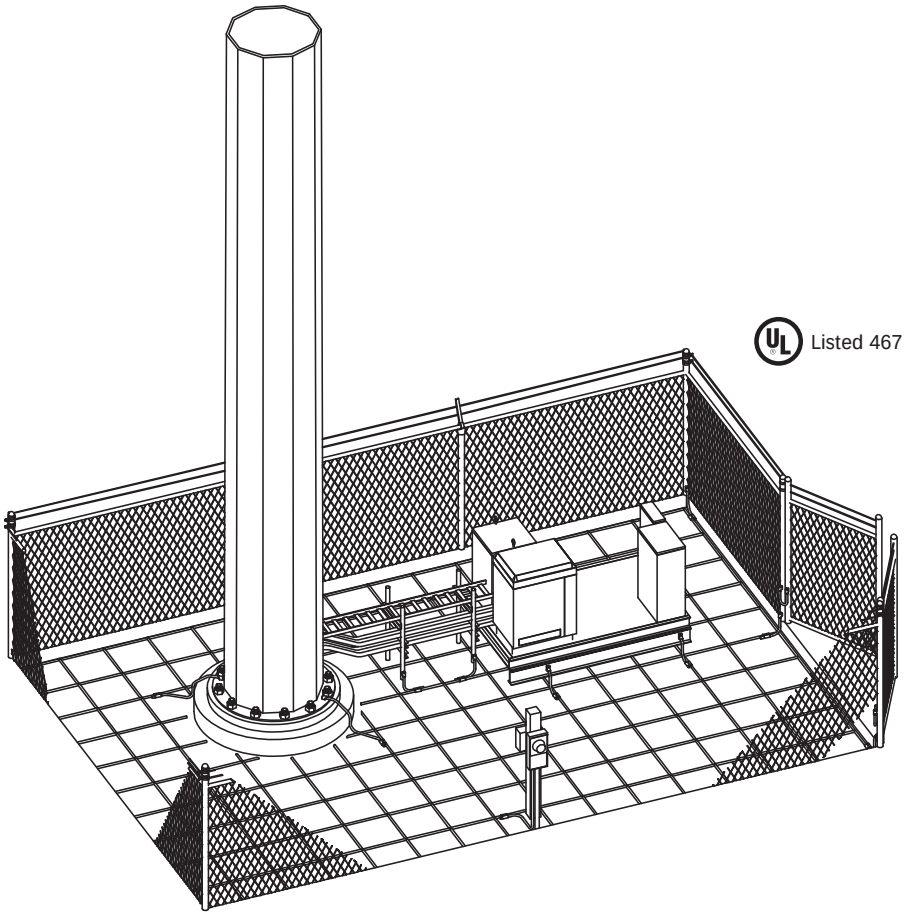
- Manufactured from 110 copper alloy.
- Two piece design sandwiches firmly secures the ground strap.
- Wall mounting hardware, ground bar and conductor not included.
- Bonds static flooring system to the telecommunications bonding and grounding system.



UL Listed 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 ensuring excellent electrical continuity, corrosion resistance and superior strength.



Standard Mat Sizes

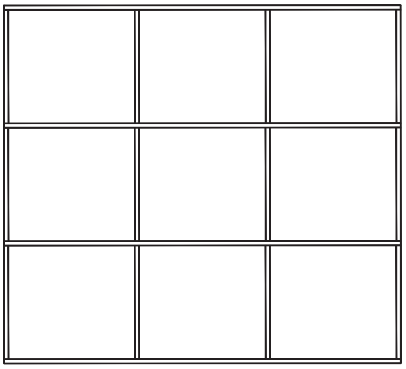
Part No.	Width (ft.)	Length (ft.)	Conductor Size/Type (AWG)	Conductor Spacing (in.)	Approx. Each Wt. (lbs.)
GM125066	12	50	6	6	214
GM1250612	12	50	6	12	117
GM1250624	12	50	6	24	69

• Other sizes available. Please contact factory for more information.

UL Listed Prefabricated Copper Ground Mesh

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

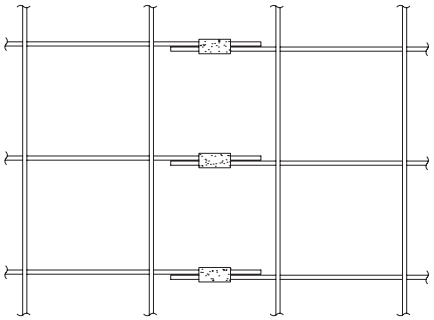
Listed 467



No Overhang

The overlapping end configuration is designed to allow for side by side connections of adjoining mats. This type of connection provides the easiest 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".

Listed 467



"Overlapping" ends

Mesh Net Weight in Pounds per Square Foot

Wire Type	Mesh Cell Size						
	4" x 4"	6" x 6"	8" x 8"	12" x 12"	24" x 24"	24" x 48"	48" x 48"
#10 Cu	0.199	0.132	0.099	0.067	0.034	0.027	0.019
8CW3D	0.257	0.171	0.129	0.087	0.045	0.035	0.024
#8 Cu	0.312	0.208	0.157	0.106	0.055	0.042	0.030
6CW3D	0.451	0.301	0.227	0.153	0.080	0.061	0.043
#6 Cu	0.491	0.328	0.248	0.167	0.087	0.067	0.047
#4 Cu	0.775	0.519	0.392	0.265	0.138	0.106	0.075

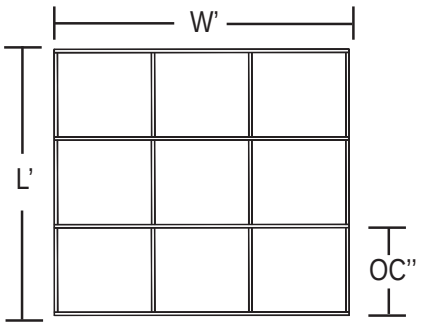
You need to first do the calculation for the net weight in order to calculate the gross shipping weight.

To Calculate Net Weight: Net Weight = Width (ft.) x Length (ft.) x Table Value (lb/ft^2)

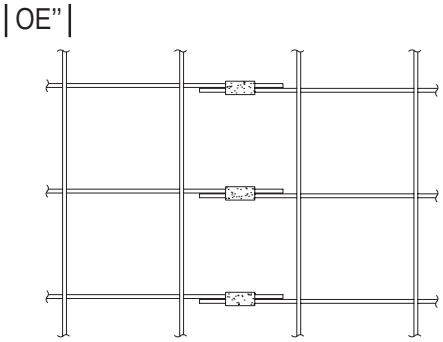
To Calculate Gross Shipping Weight: Gross Weight = Net Weight + [3.38 x (Mesh Width (ft.) + 1 (ft.))]

Example: 10' x 100', #6 Cu Wire Type, 6" x 6" Cell Size, from table 0.328 (lb/ft^2)
Net Weight = 10 x 100 x 0.328 = 328 lbs.
Gross Weight = 328 + [3.38 x (10 + 1)] = 365 lbs.

Copper Ground Mesh Worksheet



No Overhang



Overlapping ends

Example

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% conductivity)

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

Conductors

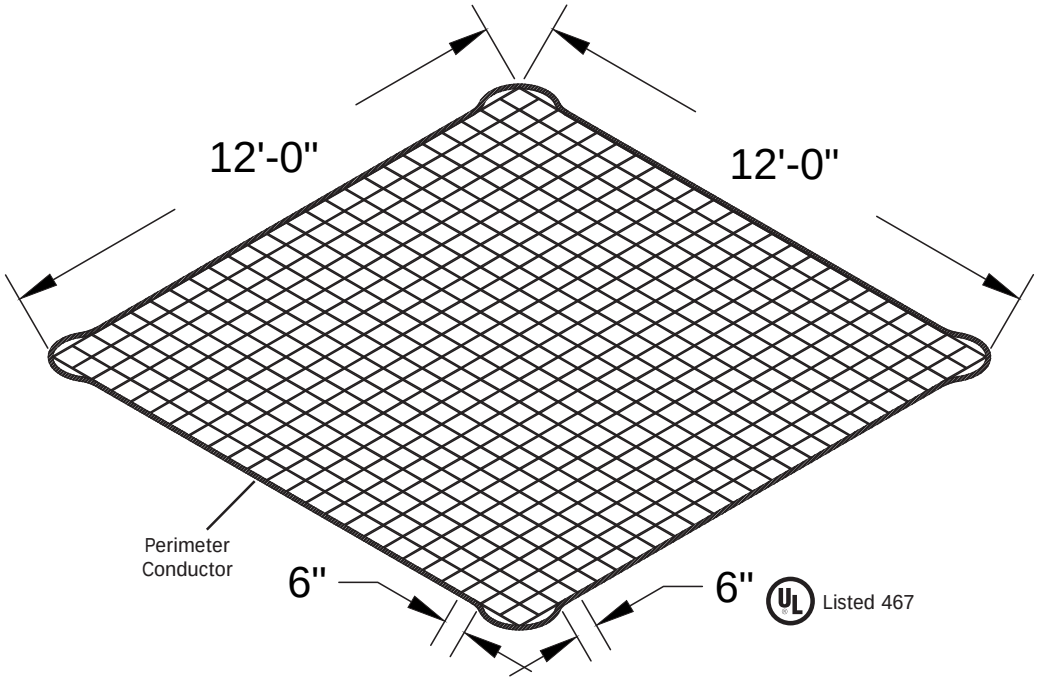
Part No.	Type
4	Solid Copper
6	Solid Copper
6CW3D	Copper Clad 30% Conductivity
8	Solid Copper
8CW3D	Copper Clad 30% Conductivity
10	Solid Copper

End Type	Description
OE1	Overlapping End, Overhang 1 End
OE2	Overlapping End, Overhang 2 Ends

DON'T COUNT THE OVERHANG FOR TOTAL LENGTH/WIDTH

NOTES:
- Overlapping ends are equal to 1/2 the O.C. spacing plus 2" unless specified otherwise.
- 40% DSA conductor available. Please contact factory for more information.

Copper Ground Mesh



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.

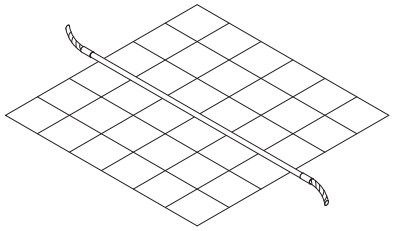
APPLICATION NOTES:

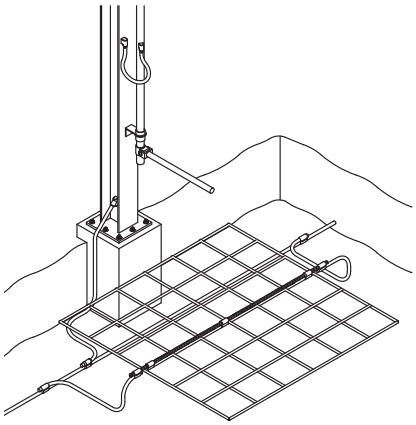
- For enhancing external grounding systems at radio, paging, cellular, etc. transmitting/receiving facilities.
- If strategically placed, mesh can be used as a safety adjunct to reduce dangerous step and touch potentials.
- Perimeter conductor makes for easy attachment to ground conductors.

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.

UL Listed 467





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% conductivity)
Mesh Size:	2" square through 12" square in 2" increments
Center Wire:	Optional - See Page 11, Section 1.1 for conductors available. Comes with standard 6" overhang on both sides of mat.

Conductors

Part No.	Type
4	Solid Copper
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	6	1/0 Sol.	11
PSM4644C2/0	4	6	4	4	2/0	23
PSM61066C4/0S	6	10	6	6	4/0 Sol.	26

NOTES:

- 40% DSA conductor available. Please contact factory for more information.

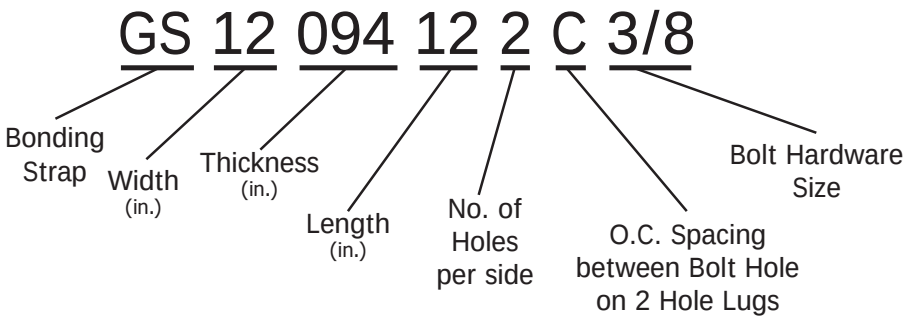
Section 1.7

Bonding Straps/Bonding Jumpers

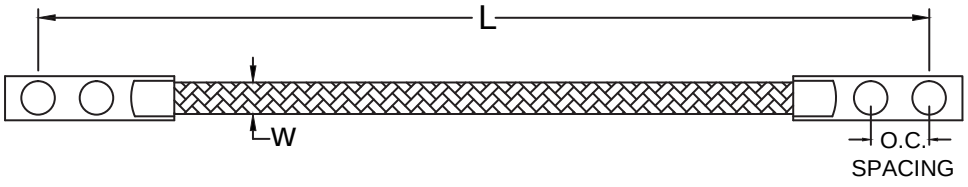
Index

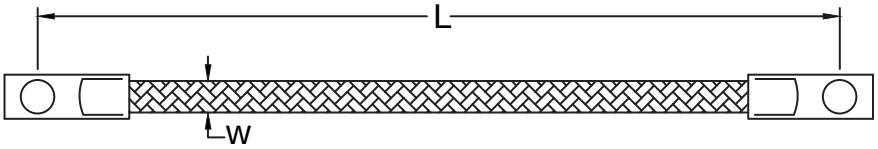
Bonding Strap Numbering System

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.

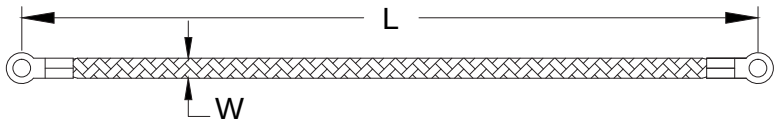


1. Width of braid strap
2. Thickness of braid strap
3. Length of braid strap (O.C. from lug hole)
4. Specifies one or two holes per side of strap
5. O.C. Spacing between Bolt Hole on 2 Hole Lugs
   A=5/8", B=3/4", C=1", D=1-3/4"
6. Bolt hole size



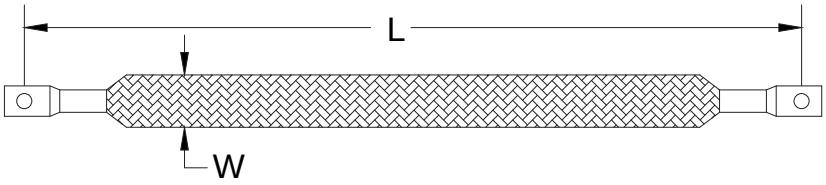


One Hole Tinned Flat Braid Copper Bonding Straps

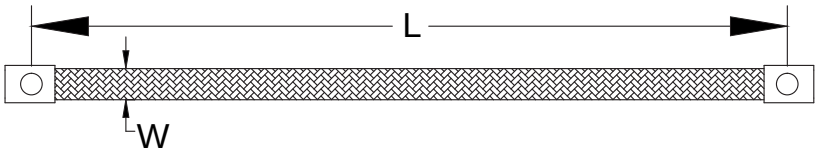


Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS140306R13/8	1/4"	.030"	14	6"	1	3/8"	1/2	10	5
GS1403012R13/8	1/4"	.030"	14	12"	1	3/8"	1/2	10	5
GS1403024R13/8	1/4"	.030"	14	24"	1	3/8"	1/2	10	5

• "R" indicates Ring Lug.



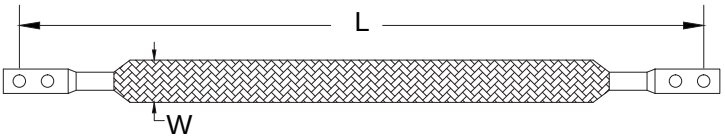
Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS12094613/8	1/2"	.094"	6	6"	1	3/8"	1/2	10	5
GS120941213/8	1/2"	.094"	6	12"	1	3/8"	1/2	10	5
GS120942413/8	1/2"	.094"	6	24"	1	3/8"	1/2	10	5



Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS5806215.188PTMW	5/8"	.062	8	15.2"	1	7/16"	1/4	10	2-1/2

APPLICATION NOTES:
- Dimensions are nominal sizes.
- See page 104 for strap dimensions.
- Other sizes available. Please contact factory for more information.

Two Hole Tinned Flat Braid Copper Bonding Straps



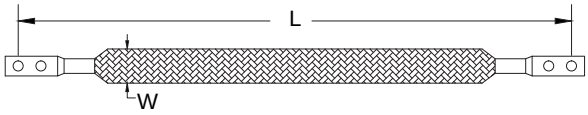
Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS14030102A1/4	1/4"	.030"	14	10"	2	5/8"	1/4"	1/2	10	5
GS14030162A1/4	1/4"	.030"	14	16"	2	5/8"	1/4"	1/2	10	5
GS14030242A1/4	1/4"	.030"	14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

Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS12094122A1/4	1/2"	.094"	6	12"	2	5/8"	1/4"	1/2	10	5
GS12094122C3/8	1/2"	.094"	6	12"	2	1"	3/8"	1/2	10	5
GS12094182A1/4	1/2"	.094"	6	18"	2	5/8"	1/4"	1/2	10	5
GS12094182C3/8	1/2"	.094"	6	18"	2	1"	3/8"	1/2	10	5
GS12094242A1/4	1/2"	.094"	6	24"	2	5/8"	1/4"	1/2	10	5
GS12094242C3/8	1/2"	.094"	6	24"	2	1"	3/8"	1/2	10	5

Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes Per Side	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS34062122A1/4	3/4"	.062"	6	12"	2	5/8"	1/4"	1/2	10	5
GS34062122C3/8	3/4"	.062"	6	12"	2	1"	3/8"	1/2	10	5
GS34062182A1/4	3/4"	.062"	6	18"	2	5/8"	1/4"	1/2	10	5
GS34062182C3/8	3/4"	.062"	6	18"	2	1"	3/8"	1/2	10	5
GS34062242A1/4	3/4"	.062"	6	24"	2	5/8"	1/4"	1/2	10	5
GS34062242C3/8	3/4"	.062"	6	24"	2	1"	3/8"	1/2	10	5
GS34062302A1/4	3/4"	.062"	6	30"	2	5/8"	1/4"	1/2	10	5
GS34062302C3/8	3/4"	.062"	6	30"	2	1"	3/8"	1/2	10	5

APPLICATION NOTES:
- Dimensions are nominal sizes.
- See page 104 for strap dimensions.
- Other sizes available. Please contact factory for more information.

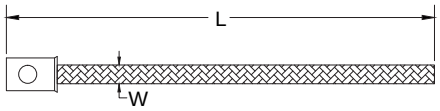
Two Hole Tinned Flat Braid Copper Bonding Straps



Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS1062122A1/4	1"	.062"	4	12"	2	5/8"	1/4"	1/2	10	5
GS1062122C3/8	1"	.062"	4	12"	2	1"	3/8"	1/2	10	5
GS1062182A1/4	1"	.062"	4	18"	2	5/8"	1/4"	1/2	10	5
GS1062182C3/8	1"	.062"	4	18"	2	1"	3/8"	1/2	10	5
GS1062242A1/4	1"	.062"	4	24"	2	5/8"	1/4"	1/2	10	5
GS1062242C3/8	1"	.062"	4	24"	2	1"	3/8"	1/2	10	5

- Dimensions are nominal sizes.
- See page 104 for strap dimensions.
- Other sizes available. Please contact factory for more information.

One Hole Bare Copper Braid Bonding Strap



Part No.	Braid Width	Thickness	Gauge Equivalent (AWG)	Length	No. of Holes	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS58101TIE	7/16"	.070"	7	10"	1	7/16"	1/4	10	2-1/2

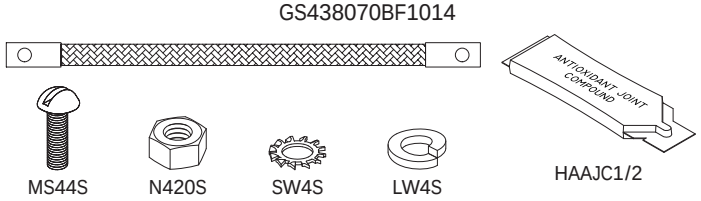
One Hole Bare Copper Braid Bonding Strap Kit

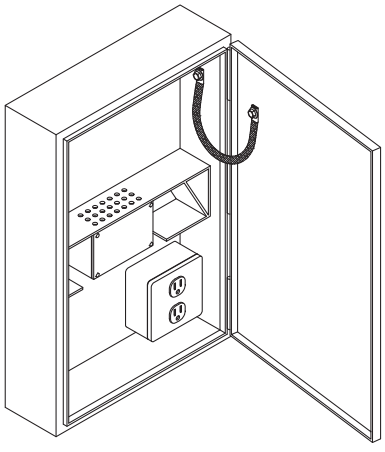
Part No.	Braid Width	Thickness	Length	No. of Holes	O.C. Spacing	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GS438070BF1014KIT	7/16"	.070"	10"	1	10-1/8"	1/4"	1/4	10	2-1/2

- Other sizes available. Please 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 x 1/2" stainless steel hex nut screw
(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 Numbering System

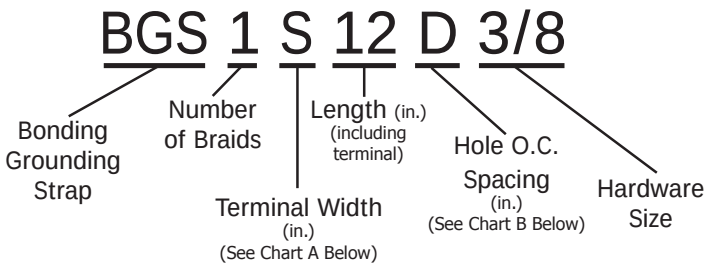


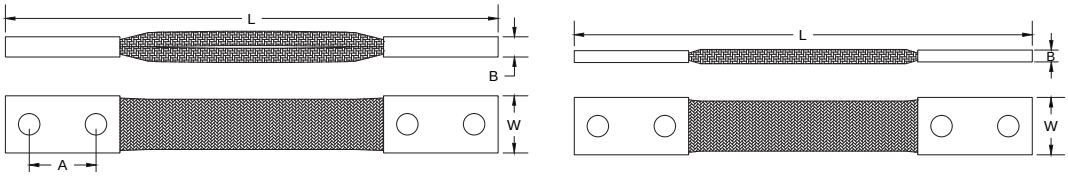
Chart A

Standard Terminal Width
R = 3/4"
S = 1"
T = 1-3/8"
U = 1-1/4"
V = 1-1/2"
W = 1-3/4"
X = 2"
Y = 2-3/8"
Z = 3"

Chart B

Hole O.C. Spacing
A = 1/2"
B = 3/4"
C = 1"
D = 1-3/4"
E = 1-1/4"
F = 1-1/2"

Bonding/Grounding Straps

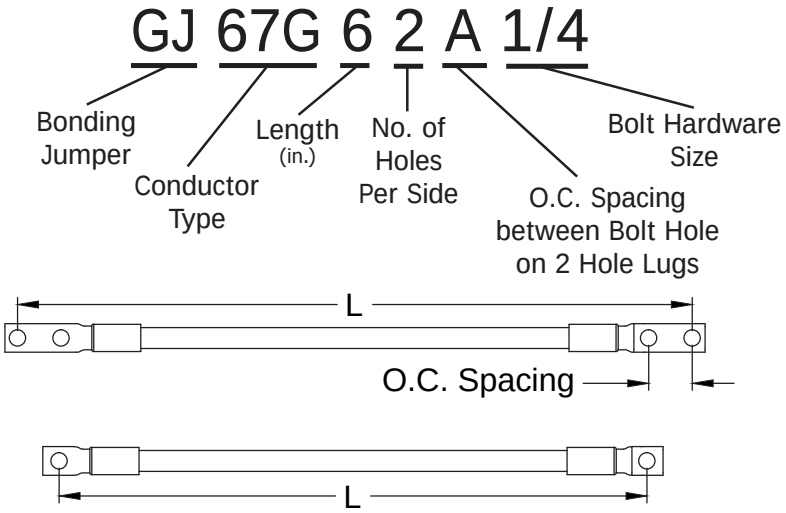


Part No.	Number of Braids	Terminal Width	Length Terminal End to End	Hole O.C. Spacing	Hardware Size	Qty.	Approx. Each Wt. (lbs.)
BGS1S12D3/8	1	1"	12"	1-3/4"	3/8"	EA	1/2
BGS1S24E3/8	1	1"	24"	1-1/4"	3/8"	EA	1
BGS2S12E1/2	2	1"	12"	1-1/4"	1/2"	EA	1
BGS1V12F1/2	1	1-1/2"	12"	1-1/2"	1/2"	EA	1/2
BGS1V18D1/2	1	1-1/2"	18"	1-3/4"	1/2"	EA	3/4

- Terminal ends come tinned as standard. Bare, silver, nickel are available.
- Braid comes tinned as a standard.
- Other sizes are available. Please contact factory for more information.

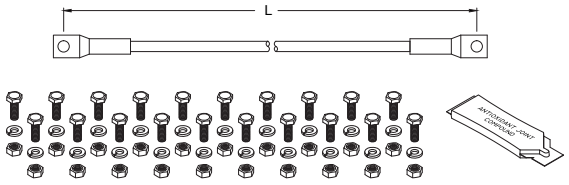
Bonding Jumper Numbering System

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

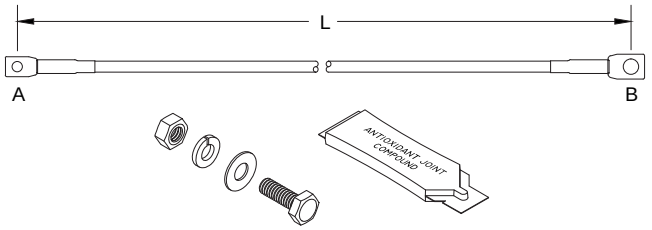
One Hole Bonding Jumpers & Kits



Part No.	Kit	Conductor Type	Length	No. of Holes Per Side	Hardware Size	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GJ67G1211/4	No	67G	12"	1	1/4"	1/4	10	5
GJ67G1211/4KIT5	Yes	67G	12"	1	1/4"	1-1/4	5	6-1/4
GJ67G1811/4	No	67G	18"	1	1/4"	1/4	10	5
GJ67G1811/4KIT5	Yes	67G	18"	1	1/4"	1-1/4	5	6-1/4
GJ67G2411/4	No	67G	24"	1	1/4"	1/4	10	5
GJ67G2411/4KIT5	Yes	67G	24"	1	1/4"	1-1/4	5	6-1/4

- #6 AWG x 7 Strand Green THW insulation. Kit includes all necessary hardware.
- Other sizes and types available. Please contact factory for more information.

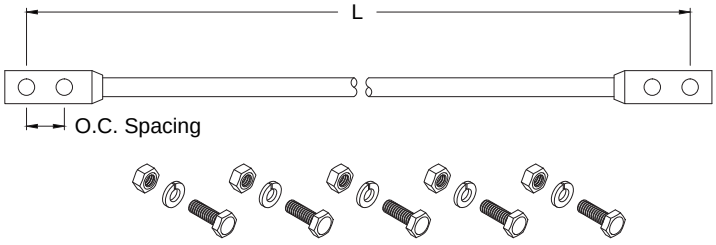
Bonding Jumper Kit



Part No.	Conductor Type	Length	No. of Holes Per Side	Hardware Size A	Hardware Size B	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GJ67G72EMSKIT	67G	73-1/4"	1	1/4"	3/8"	2	5	10

- #6 AWG x 7 strand green THW insulated.
- Bonding Jumper for 1/4" stud to ground bar or ground metal body.
- Includes 1/2 ounce antioxidant (HAAJC1/2) and 3/8" hardware.

Two Hole Insulated Bonding Jumpers & Kits



Part No.	Conductor Type	Length	No. of Holes Per Side	Hardware Size	Jumper or Kit	Approx. Each Wt. (lbs.)	Box Qty.	Approx. Box Wt. (lbs.)
GJ67G82A1/4	67G	8"	2	1/4"	Jumper	1/8	10	1-1/4
GJ67G82A1/4KIT	67G	8"	2	1/4"	Kit	1/8	10	1-1/4
GJ67G82A1/4KIT5	67G	8"	2	1/4"	Kit	3/4	5	3-3/4
GJ67G102A1/4	67G	10"	2	1/4"	Jumper	1/4	10	2-1/2
GJ67G102A1/4KIT	67G	10"	2	1/4"	Kit	1/4	10	2-1/2
GJ67G102A1/4KIT5	67G	10"	2	1/4"	Kit	1-1/4	5	6-1/4
GJ67G122A1/4	67G	12"	2	1/4"	Jumper	1/4	10	2-1/2
GJ67G122A1/4KIT	67G	12"	2	1/4"	Kit	1/4	10	2-1/2
GJ67G122A1/4KIT5	67G	12"	2	1/4"	Kit	1-1/4	5	6-1/4

- #6 AWG x 7 Strand Green THW insulation. Kit includes all necessary hardware.
- Spacing between bolt holes is 5/8" on center.
- Other sizes and types available. Please contact factory for more information.

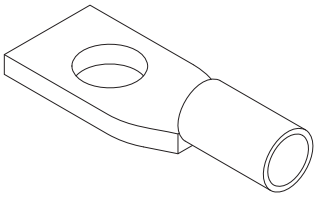
Section 1.8

Compression Lugs, Connectors & Tools

Index

One Hole Compression Lugs

Part No.	Conductor Size (AWG)	Hardware Size	Long Barrel	Color Code	Box Qty.	Approx. Box Wt. (lbs.)
GECL6	6	1/4"	No	Blue	50	1
GECLB6	6	1/4"	Yes	Blue	50	1-1/2
GECL63/8	6	3/8"	No	Blue	50	2
GECLB63/8	6	3/8"	Yes	Blue	50	1-1/2
GECL4	4	1/4"	No	Gray	50	1-1/2
GECLB4	4	1/4"	Yes	Gray	50	2
GECL2	2	5/16"	No	Brown	50	2
GECLB2	2	5/16"	Yes	Brown	50	2
GECL23/8	2	3/8"	No	Brown	50	2
GECLB23/8	2	3/8"	Yes	Brown	50	2
GECL21/4	2	1/4"	No	Brown	50	2
GECLB21/4	2	1/4"	Yes	Brown	50	2
GECL1/0	1/0	3/8"	No	Pink	10	1/2
GECLB1/0	1/0	3/8"	Yes	Pink	10	1
GECL2/0	2/0	3/8"	No	Black	10	1
GECLB2/0	2/0	3/8"	Yes	Black	10	2
GECL4/0	4/0	1/2"	No	Purple	10	1
GECLB4/0	4/0	1/2"	Yes	Purple	10	3



Standard Barrel

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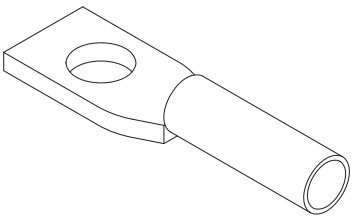
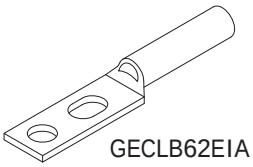
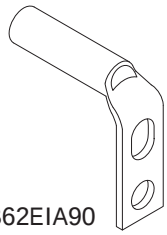


Long Barrel

Specialized Compression Lugs



GECLB62EIA



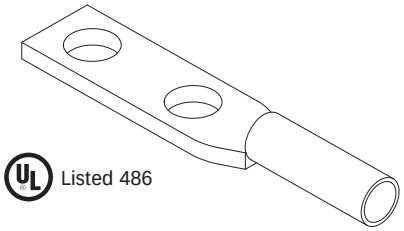
GECLB62EIA90

Part No.	Conductor Size (AWG)	Hole Spacing Range	Hardware Size	Bend Angle	Color Code	Box Qty.	Approx. Box Wt. (lbs.)
GECLB62EIA	#6 or #6 FLEX	.5" - .625"	1/4"	No Bend	Blue	50	1-1/2
GECLB62EIA90	#6 or #6 FLEX	.5" - .625"	1/4"	90°	Blue	50	1-1/2

- Designed to fit standard EIA spacing.

NOTES:
- Manufactured from electro plated tinned copper.
- For use on copper or tinned copper conductors.
- Lugs have inspection ports.
- Other sizes available. Please contact factory for more information.
- See page 148 for antioxidants.

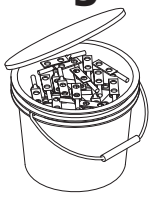
Two Hole Long Barrel Compression Lugs

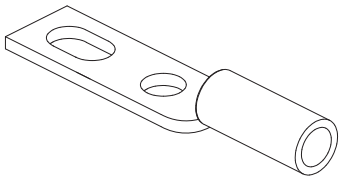


Part No.	Conductor Size (AWG)	O.C. Dim. B/T Holes	Hardware Size	Color Code	Box Qty.	Approx. Box Wt. (lbs.)
GECLB62A	6	.625"	1/4"	Blue	50	1-1/2
GECLB62B	6	.75"	3/8"	Blue	50	2
GECLB62C	6	1"	3/8"	Blue	50	2
GECLB42A	4	.625"	1/4"	Gray	25	1-1/2
GECLB42B	4	.75"	1/4"	Gray	25	1-1/2
GECLB42C	4	1"	3/8"	Gray	25	2
GECLB22A	2	.625"	1/4"	Brown	25	1-1/2
GECLB22B	2	.75"	3/8"	Brown	25	1-1/2
GECLB22BS	2 Sol.	.75"	3/8"	White	25	2
GECLB22C	2	1"	3/8"	Brown	25	2
GECLB22CS	2 Sol.	1"	3/8"	White	25	2-1/2
GECLB1/02C	1/0	1"	3/8"	Pink	10	2
GECLB1/02D	1/0	1.75"	1/2"	Pink	10	2
GECLB2/02C	2/0	1"	3/8"	Black	10	1-1/2
GECLB2/02D	2/0	1.75"	1/2"	Black	10	1-1/2
GECLB3/02C	3/0	1"	3/8"	Orange	10	2
GECLB4/02C	4/0	1"	3/8"	Purple	10	2
GECLB4/02D	4/0	1.75"	1/2"	Purple	10	2-1/2
GECLB2502C	250	1"	3/8"	Yellow	10	3
GECLB2502D	250	1.75"	1/2"	Yellow	10	4
GECLB5002C	500	1"	3/8"	Brown	10	5
GECLB5002D	500	1.75"	1/2"	Brown	10	8
GECLB7502C	750	1"	3/8"	Black	10	10
GECLB7502D	750	1.75"	1/2"	Black	10	11

- Manufactured from electro plated tinned copper.
- For use on copper or tinned copper conductors.
- Lugs have inspection ports.
- Other sizes available. Please contact factory for more information.
- For copper exothermic lugs, see pages 314-315 (SXL, OXL, BXL & JXL)
- See page 148 for antioxidants.

Slotted Long Barrel Compression Lugs





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Part No.	Conductor Size (AWG)	Hole Spacing Range	Hardware Size	Color Codes	Box Qty.	Approx. Box Wt. (lbs.)
GECLB62BC	#6 Str.	.75" to 1"	3/8"	Blue	50	2
GECLB62BC250BK	#6 Str.	.75" to 1"	3/8"	Blue	250	10
GECLB22BCS	#2 Sol.	.75" to 1"	3/8"	White	50	2
GECLB22BCS250BK	#2 Sol.	.75" to 1"	3/8"	White	250	13
GECLB22BC	#2 Str.	.75" to 1"	3/8"	Brown	50	2
GECLB22BC250BK	#2 Str.	.75" to 1"	3/8"	Brown	250	16

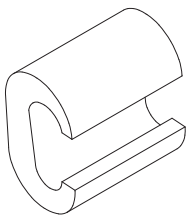
- Manufactured from electro plated tinned copper.
- For use on copper or tinned copper conductors.
- Lugs have inspection ports.
- 250 pack comes in one gallon bucket.
- See page 148 for antioxidants

C-Type Compression Taps

Connects two copper conductors together with a hydraulic crimp tool.
Please refer to the chart for the appropriate connector.

Heavy Duty C-Taps

Part No.	Conductor (AWG) Run	Conductor (AWG) Tap	Die Index	Box Qty.	Approx. Box Wt. (lbs.)
CT4666	#4 Stranded #6 Solid	#6 Stranded #6 Solid	BG	50	2-1/2
CT4446	#4 Stranded #6 Solid	#4 Stranded #4 Solid	BG	50	2-1/2
CT2248	#2 Stranded #2 Solid	#4 Stranded #8 Solid	C	50	6
CT2222	#2 Stranded #2 Solid	#2 Stranded #2 Solid	C	50	4
CT22/0	2/0 Stranded 1/0 Solid	#2 Stranded #8 Solid	O	10	1
CT24/0	4/0 Stranded 3/0 Solid	#2 Stranded #6 Solid	D3	10	1
CT2/02/0	2/0 Stranded 1/0 Solid	2/0 Stranded 1/0 Solid	O	10	1
CT4/02/0	4/0 Stranded 3/0 Solid	2/0 Stranded 1/0 Solid	D3	10	2
CT4/04/0	4/0 Stranded 3/0 Solid	4/0 Stranded 3/0 Solid	D3	10	2



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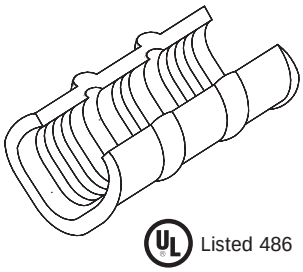
C-Type Compression Taps

Light Duty C-Taps

Part No.	Conductor (AWG) Run	Conductor (AWG) Tap	Color Code	Box Qty.	Approx. Box Wt. (lbs.)
CT4666LD	#6 Stranded #5, #4 AWG	#8-#6 Stranded #12 - #8 AWG	Brown	100	2
CT2248LD	#4 Stranded #3 Stranded #2 Stranded	#4 Stranded #5 Stranded #12-#6 Stranded	Pink	100	4
CT2222LD	#2 Stranded #2 Solid	#2 Str. - #2 Sol. #3 Str. - #3 Sol.	Orange	50	5
	#1 Stranded #1 Solid	#4 Str. - #4 Sol. #3 Str. - #3 Sol.			
	1/0 Stranded 1/0 Solid	#12 Str. - #12 Sol. #4 Str. - #4 Sol.			



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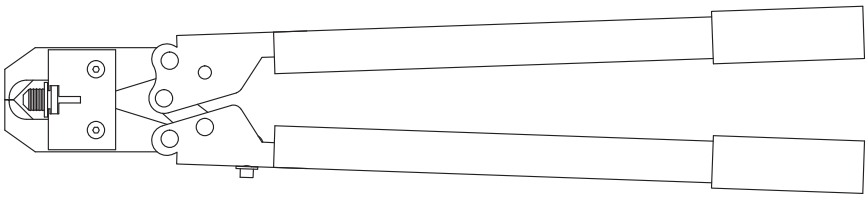
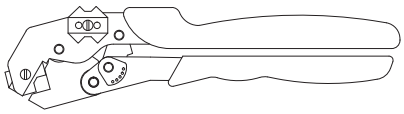
• Other sizes available. Please contact factory for more information.

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.)
MCT81/0	10-1/2"	3

- Handy compression tool terminates copper compression connectors in wire sizes #8 AWG through 1/0.
- Handle length facilitates two-handed crimps when necessary.
- Approximately 2 tons of force.
- Dies included.

Hydraulic Compression Tools & Dies

Part No.	Qty.	Approx. Each Wt. (lbs.)
B131LCA	EA	11.55

- Used when crimping lugs and splices up to 800 MCM, insulated terminals up to 400 MCM and c-taps up to 350 MCM.
- Hydraulic "C" head tool features a large 1.65 inch jaw opening allowing for easier insertion/removal of large size compression terminations and joints.
- Crimping head rotates 180 degrees to facilitate usage in confined spaces.
- Provides 14.6 ton crimping force.
- Used with die sets MY-C, ME-C & MC-C.
- Available in 7 die kit. Contact the factory for details.

Part No.	Qty.	Approx. Each Wt. (lbs.)
HT131LC	EA	11.55

- Used when crimping lugs and splices up to 800 MCM, insulated terminals up to 400 MCM and c-taps up to 350 MCM.
- Hydraulic "C" head tool features a large 1.65 inch jaw opening allowing for easier insertion/removal of larger size compression terminations and joints.
- Crimping head rotates 180 degrees facilitating usage in confined spaces.
- Provides 14.6 ton crimping force.
- Will accept all semicircular slotted dies common to most 12 ton tools.
- Available in 7 die kit. Contact the factory for details.

Section 1.9

Mechanicals

Terminal Lugs, Split Bolts & Pipe Clamps

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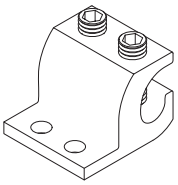
NOTE: Copper materials can consist of copper, bronze or brass. All are copper alloys.

Dual Rated Two-Hole Aluminum Lay-In Lug

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



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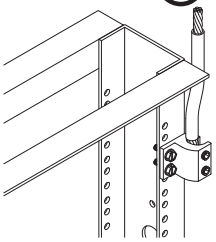
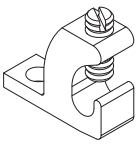


- Approximately 1-5/8" x 1-1/2" electro-tin plated aluminum lug allows attachment of copper or aluminum conductors to racks and cabinets.
- Includes two 3/8" x 1" hex head socket set screws. Requires a 3/16" Hex Key (not included).
- Meets ANSI J-STD-607-A two-hole mounting recommendations.
- UL Listed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

One-Hole Tinned Copper Lay-In Lug

Part No.	Conductor Range (AWG) Maximum	Minimum	Bolt Hole Size	Box Qty.	Approx. Box Wt. (lbs.)
TCLI414DB	4	14	#10	10	3/4



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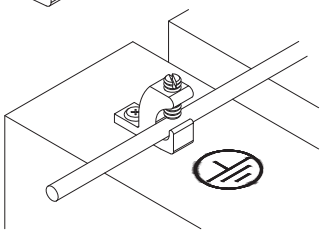
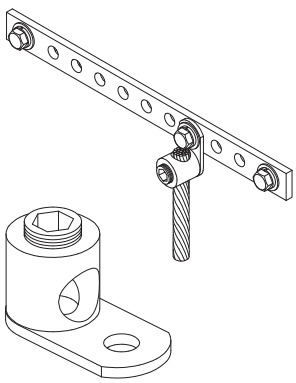


- Used for grounding or continuous loop bonding in applications such as pool grounding or PV array frame grounding.
- Approximately 1-1/8" x 3/8" x 7/8" electro-tin plated copper lug.
- Includes slotted stainless steel set screw.
- Tongue accepts #10 screw.
- Allows conductor to be laid in without cutting conductor.
- Corrosion resistant.
- Suitable for direct burial.

Copper Terminal Lugs

Part No.	Conductor Range (AWG) Maximum	Minimum	Bolt Hole Size	Ampere Rating	Box Qty.	Approx. Box Wt. (lbs.)
GEL1	8 Str.	14 Sol.	#8	35	100	2-1/4
GEL2	4 Str.	14 Sol.	1/4"	70	100	5-1/2
GEL3	1/0 Str.	8 Sol.	5/16"	125	50	5-1/4
GEL4	250 MCM	6 Sol.	3/8"	250	25	5



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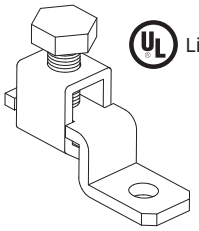
Copper Offset Terminal Lugs

Part No.	Conductor Range (AWG) Maximum	Minimum	Bolt Hole Size	Ampere Rating	Box Qty.	Approx. Box Wt. (lbs.)
GEOL1	10 Str.	14 Str.	#8	25	100	2-1/2
GEOL2	6 Str.	14 Str.	#8	50	100	2-1/4
GEOL3	2 Str.	8 Str.	1/4"	70	100	4
GEOL4	1/0 Str.	8 Str.	1/4"	125	25	3
GEOL5	4/0 Str.	2 Str.	3/8"	225	25	6
GEOL500MCM	500 MCM	1/0 Str.	1/2"	400	10	8



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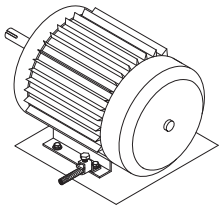
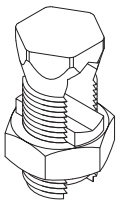
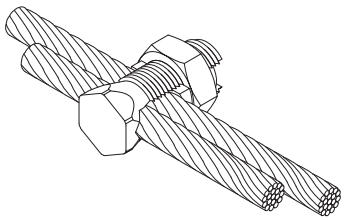


Copper Split Bolts

Part No.	Conductor Range for Equal Main (AWG)	Minimum Tap	Box Qty.	Approx. Box Wt. (lbs.)
GESB6	4 Sol. - 8 Sol.	16 Sol.	100	7-1/4
GESB2	2 Str. - 6 Sol.	14 Str.	50	6
GESB1/0	1/0 Str. - 4 Sol.	14 Sol.	20	3-1/4
GESB2/0	2/0 Str. - 2 Sol.	14 Str.	15	3-1/4
GESB4/0	4/0 Str. - 1/0 Sol.	10 Sol.	10	3-3/4
GESB250	250 MCM - 1/0 Str.	10 Sol.	10	3-3/4





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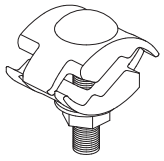
• Suitable for direct burial.

Other sizes available. Please contact the factory for more information.

Cable Connectors

1 Bolt Bonding Connectors

Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
208	Copper	#6 - 4/0	10	2-1/2
208T	ETPB*	#6 - 4/0	10	2-1/2



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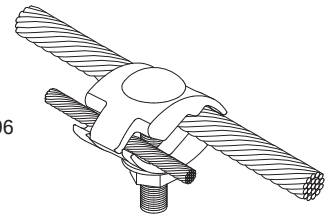
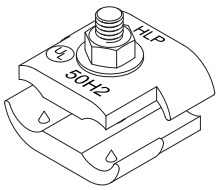


- Approximately 7/8" x 1-5/8" one bolt, two piece connector splices conductor up to 9/16" diameter.
- 5/16" x 1-7/8" stainless steel carriage bolts, flat washer and nut included.
- Manufactured from high conductivity copper alloy.
- Recommended installation tool - 1/2" deep socket wrench, end wrench or nut driver.
- Suitable for direct burial.

*ETPB - Electro Tin Plated Bronze.

1 Bolt Parallel Connectors

Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
B1BC	Copper	#6 - 250 MCM	10	4
TB1BC	ETPB*	#6 - 250 MCM	10	4



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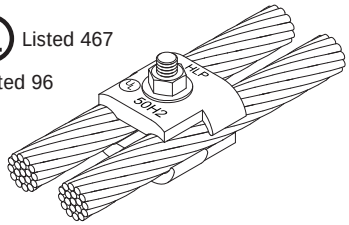

- Approximately 2" square, two piece connector provides over 1-1/2" surface contact between conductors.
- 5/16" x 1-7/8" stainless steel cap screw with flat washer and nut included.
- Manufactured from high conductivity copper alloy.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- Suitable for direct burial.

*ETPB - Electro Tin Plated Bronze.

2 Bolt Parallel Connectors

Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
204	Copper	#6 - 250 MCM	10	4-1/2
204T	ETPB*	#6 - 250 MCM	10	4-1/2

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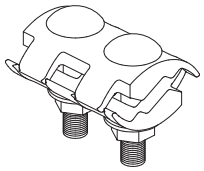
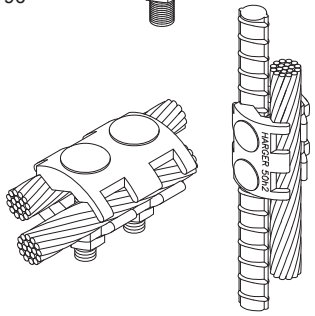


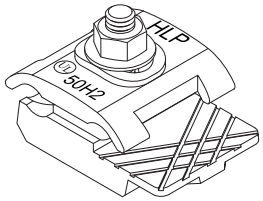


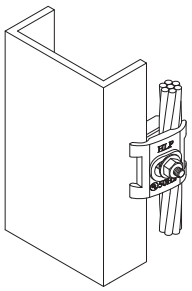
- Approximately 2" x 1-3/4" two piece connector used for splicing cables and rods.
- 5/16" x 1-7/8" stainless steel carriage bolts, flat washers and nuts included.
- Manufactured from high conductivity copper alloy.
- Recommended installation tool - 1/2" deep socket wrench, end wrench or nut driver.
- Suitable for direct burial.

*ETPB - Electro Tin Plated Bronze.

Bonding Clamps

Cable to Flat Metal Connectors





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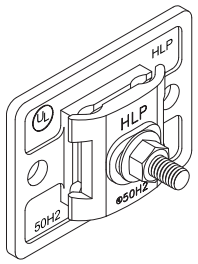
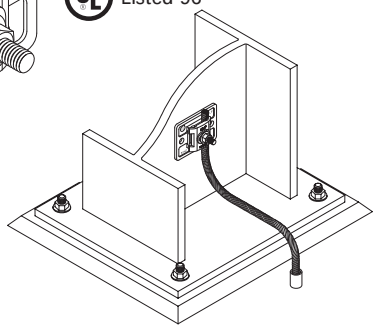
Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
213	Copper	#6 - 4/0	10	4-1/2
213T	ETPB*	#6 - 4/0	10	4-1/2

- Approximately 1-3/4" x 2" two piece, one bolt connector connects conductors through 9/16" 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.
- Manufactured from high conductivity copper alloy.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- Suitable for direct burial.

*ETPB - Electro Tin Plated Bronze.

Bonding Plate





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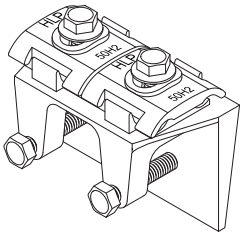
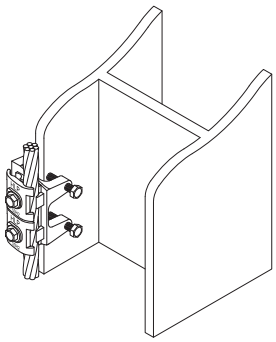
Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
217	ETPB*	#6 - 4/0	5	3-1/2

- 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.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- Suitable for direct burial.

*ETPB - Electro Tin Plated Bronze.

Flange Bonding Clamp





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Part No.	Material	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
223	Copper	#6 - 4/0	10	20
223T	ETPB*	#6 - 4/0	10	20

- Approximately 3-3/4" x 2-1/2" bonding plate provides over 8 square inches of bonding surface.
- Large cable connector offers 3" of contact between the bonding plate and the cable.
- Accommodates conductors up to 9/16" diameter.
- Ideal for bonding to steel I-beams up to 1" thick.
- Recommended installation tool - 1/2" socket wrench, end wrench or nut driver.
- Suitable for direct burial.

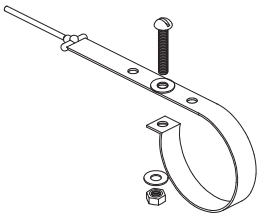
*ETPB - Electro Tin Plated Bronze.

APPLICATION NOTES:

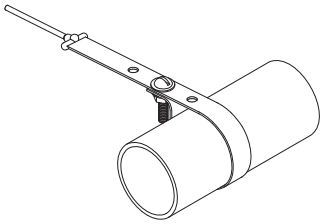
- It is imperative to properly prepare the bonding surface before applying the bonding lug or plate. All paint, rust, moisture and debris must be removed. The use of a rasp (see page 326) or grinding tool is recommended to ensure all surface oxidants have been removed. Generously coat the bonding surface 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.)	Box Qty.	Approx. Box Wt. (lbs.)
231S2-2	1-1/2" - 2-1/2"	2 Solid	1/2	25	12-1/2
231S2-4	1-1/2" - 2-1/2"	4 Solid	1/2	25	12-1/2
231S2-6	1-1/2" - 2-1/2"	6 Solid	1/2	25	12-1/2



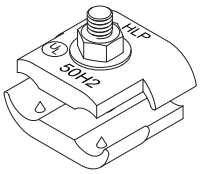
- For use in agricultural environments such as milking parlors or hog confinement facilities.
- Aids in the establishment of an equipotential ground plane thus reducing problems associated with stray voltage.
- Stainless steel bonding strap designed to fit 1-1/2" to 2-1/2" outside diameter tubing.
- Comes with a 5 foot copper conductor exothermically welded to the strap.



Cable Tray Clamps

Tinned Bronze Cable Tray Clamp

Part No.	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
TBCTC	#6 Solid through 250 MCM	10	5



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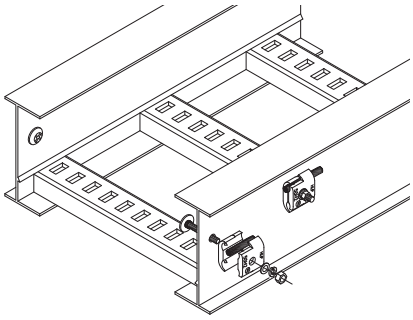
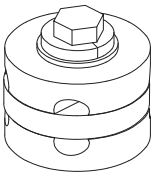
- Used for bonding galvanized steel or aluminum cable trays to the grounding electrode system.
- TBCTC can replace 3 clamps from other manufacturers due to its superior conductor range taking design.
- Electro-tin plated cast bronze.
- Two-piece connector provides a 1-1/2" linear surface contact between 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).
- Recommended installation tools: 9/16" socket wrench, open-end wrench or nut driver, 7/16" drill bit, #4 Phillips screw driver and a hammer.
- Recommended torque 15 ft-lbs.
- Suitable for direct burial.



Part No.	Conductor Size (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
CRGC6	#6	25	4
CRGC4	#4	10	5



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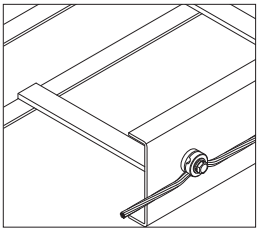
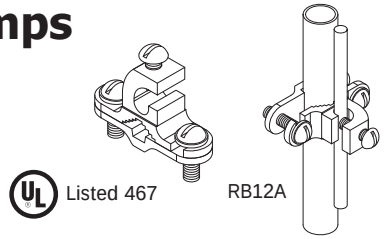


- Used for bonding galvanized steel or aluminum cable trays to the grounding electrode system.
- Used when welded connections are not feasible.
- Unique design allows clamps to form connections at most any angle.
- Electro-tin plated brass.

Rebar & Water Pipe Clamps

Part No.	Rebar Range	Pipe Range	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
RB12A	3/8" - 1"	1/2" x 1"	10 Sol. - 2 Str.	10	2-1/2
RB12B	3/8" - 1"	1/2" x 1"	10 Sol. - 2 Str.	10	2-1/2

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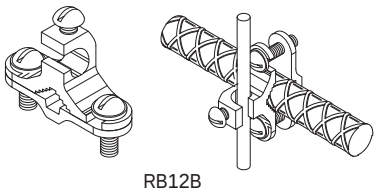
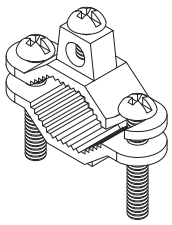
RB12A


RB12B

Water Pipe Ground Clamps

Part No.	Ground Rod or Pipe Size	Conductor Range (AWG)	Box Qty.	Approx. Box Wt. (lbs.)
BGC4	1/2" - 1"	#10 - #2	10	3
BGC41.25-2	1-1/4" - 2"	#10 - #2	10	6
BGC42.5-4	2-1/2" - 4"	#10 - #2	10	9

- Bronze clamp has many uses such as bonding to ground rods or copper water pipes.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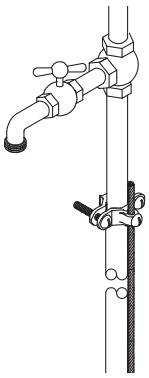


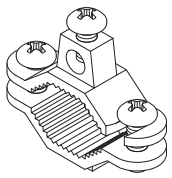
Conduit Bonding Clamps

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

- 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. Rated for direct burial.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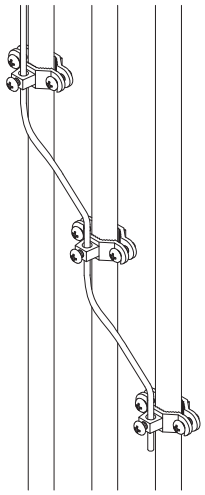
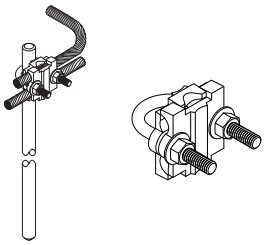


CPC Pipe Ground Clamps

- Wide conductor range; #6 Solid through 250 MCM.
- Also used for pedestal grounding.
- Dual UL Listing (UL96 and UL467).
- Acceptable for direct burial.
- Tamper Resistant comes with break away nuts.

* Electro Tin Plated Bronze includes stainless steel hardware.



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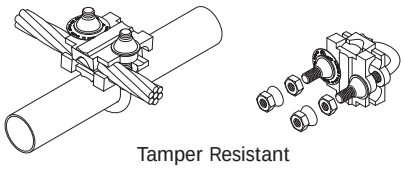
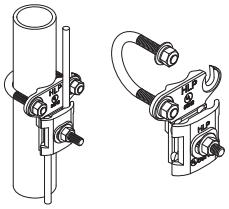


Tamper Resistant

Pipe Range .5/.75

Part No.	Tamper Resistant	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC.5/.75	No	ETPB*	.5" - .75"	.375" - 1"	5	2-1/2
CPC.5/.75TP	Yes	ETPB*	.5" - .75"	.375" - 1"	5	2-1/2



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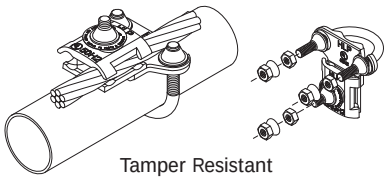
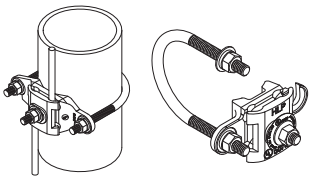


Tamper Resistant

Pipe Range 1/1.25

Part No.	Tamper Resistant	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC1/1.25	No	ETPB*	1" - 1.25"	.75" - 1.7"	5	3
CPC1/1.25TP	Yes	ETPB*	1" - 1.25"	.75" - 1.7"	5	3

- Feature “quick connect”, bi-directional design.
- Pressed stud design ensures a flush mounting surface.



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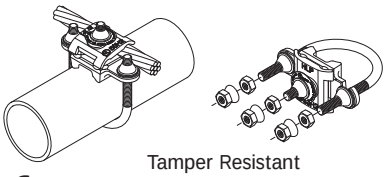


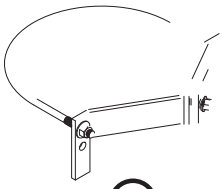
Tamper Resistant

Pipe Range 1.5 through 6

Part No.	Tamper Resistant	Material	Nominal Pipe Size Range	Pipe Outside Diameter	Box Qty.	Approx. Box Wt. (lbs.)
CPC1.5/2	No	ETPB*	1.5" - 2"	1" - 2.4"	5	3-3/4
CPC1.5/2TP	Yes	ETPB*	1.5" - 2"	1" - 2.4"	5	3-3/4
CPC2.5/3	No	ETPB*	2.5" - 3"	2.25" - 3.5"	5	5
CPC2.5/3TP	Yes	ETPB*	2.5" - 3"	2.25" - 3.5"	5	5
CPC3.5/4	No	ETPB*	3.5" - 4"	3.2" - 4.5"	5	6-1/4
CPC3.5/4TP	Yes	ETPB*	3.5" - 4"	3.2" - 4.5"	5	6-1/4
CPC5/6	No	ETPB*	5" - 6"	4.75" - 6.63"	5	8-3/4
CPC5/6TP	Yes	ETPB*	5" - 6"	4.75" - 6.63"	5	8-3/4

- Feature “quick connect”, bi-directional design.
- Pressed stud design ensures a flush mounting surface.

Universal Pipe Clamps



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- Provides bi-directional grounding capabilities making it the perfect connection for grounding large diameter pipes.
- Clamps include mechanical connector to connect ground conductors #6 AWG thru 250 MCM.
- Clamps can also be connected to ground conductors via exothermic connections and/or standard compression lugs.
- Manufactured from highly conductive tinned copper; includes stainless steel hardware.
- Provides 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 7/16" diameter 1" on center spacing.
- For conductors larger than 250 MCM exothermically weld to the clamp.
- Rated for Direct Burial.