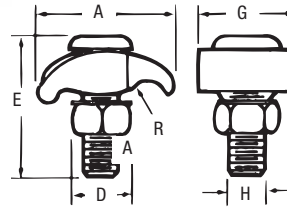


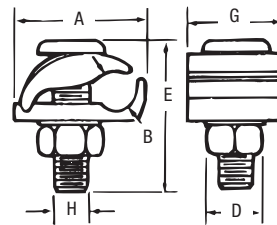
## Mechanical Grounding Connectors

### Type GTC — Tower Ground Clamps

- Bolt has square shank to prevent turning and allow clamp to be tightened with one wrench
- GTC 23 and 24 are two-piece clamps for connecting ground lead cable to flat metal surface; ideal for grounding substations on tower footings
- Castings are of high strength, corrosion resistant copper alloy
- GTC 13 and 14 are economical one-piece clamps which perform the same function as two-piece clamps except the under pad support is omitted and conductor is connected directly to tower
- Add suffix L to Cat. No. for 1/2" channel thickness



Type GTC 13 and 14



Type GTC 23 and 24



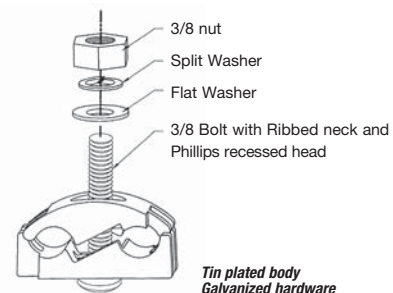
Cat. No.	Conductor Range				Channel Thickness	Dimensions (in.)						
	max.	min.	max. (mm <sup>2</sup> )	min. (mm <sup>2</sup> )		A	B	D	E	G	H	R
<b>GTC13</b>	2/0 str.	4 sol.	67.4	21.1	1/4	1-15/32	—	9/16	1-21/32	13/32	3/8	7/32
<b>GTC14</b>	250 kcmil	2/0 str.	126.6	67.4	1/4	1-15/16	—	3/4	1-15/16	1-13/32	1/2	5/16
<b>GTC23</b>	2/0 str.	4 sol.	67.4	21.1	1/4	1-41/64	7/16	9/16	2-21/32	1-3/32	3/8	—
<b>GTC24</b>	250 kcmil	2/0 str.	126.6	21.1	1/4	1-61/64	5/8	3/4	1-15/16	1-3/8	1/2	—

### CTG250 Wide Range Tower Ground Clamps

- For use with aluminum or copper conductors and in aluminum or galvanized steel cable tray.
- Ribbed neck on the bolt prevents rotation during tightening if 0.440 dia. hole is used



Cat. No.	Wide Range (2 sides)	Height	Width	Depth	Nut (Flats)
<b>CTG250</b>	#2 sol. (0.258 Dia.), 250 kcmil (0.575 Dia.)	1.95	2.00	1.13	0.560



## Mechanical Grounding Connectors

### Copper Lay-In Lug Connectors

- Ideal for swimming pool grounding applications
- Carries “DB” marking for direct burial
- Open-faced design enables installer to quickly lay-in grounding conductor as jumper to multiple conduits with no break in ground conductor

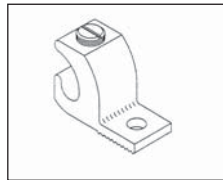
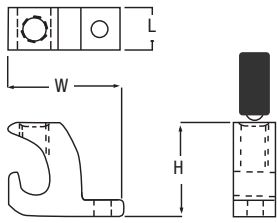


Figure 1



Cat. No.	Conductor Range		Stud Size		Dimensions					
	in.	AWG mm <sup>2</sup>	in.	mm	H		W		L	
					in.	mm	in.	mm	in.	mm
<b>CULL414</b>	4-14	16-1.5	0.22	5.59	0.78	19.81	0.38	9.65	1.07	27.18
<b>CULL414TP*</b>	4-14	16-1.5	0.22	5.59	0.78	19.81	0.38	9.65	1.07	27.18

90°C Rating.  
\* Tin plated.

### Lay-In Lug Connectors

These grounding connectors are manufactured with high strength 6061-T6 aluminum alloy to insure both maximum strength and conductivity. Dual-rated for both copper and aluminum conductor. The open-faced design allows the installer to quickly lay-in the grounding conductor as a jumper to multiple conduits with no break in the ground conductor.



Cat. No.	Fig. No.	Conductor Range		Stud Size		Dimensions					
		AWG in.	AWG mm <sup>2</sup>	in.	mm <sup>2</sup>	H		W		L	
						in.	mm	in.	mm	in.	mm
<b>LL414</b>	1	4-14	16-1.5	0.22	5.59	0.78	19.81	0.38	9.65	1.07	27.18
<b>LL1014</b>	1	1/0-14	50-1.5	0.27	6.86	1.17	29.72	0.60	15.24	1.50	38.10
<b>LL306</b>	2	3/0-6	70-16	0.33	8.38	1.56	39.62	0.80	20.32	2.00	50.80
<b>LL2506</b>	2	250-6	120-16	0.33	8.38	1.79	45.47	0.80	20.32	2.20	55.88

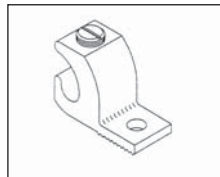
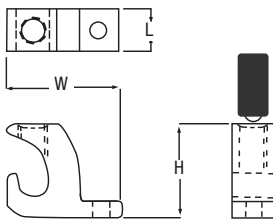


Figure 1

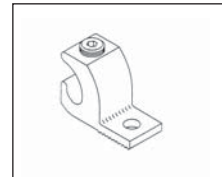


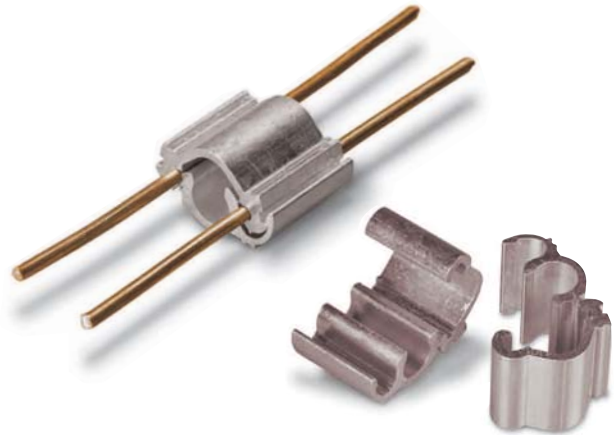
Figure 2

## Mechanical Grounding Connectors

### SnapTap® Parallel Connectors

- Designed for bonding and grounding applications using copper, steel stranded and ground rod
- Easily installed with channel locks or pliers
- Made from high-strength aluminum alloy with tin plating
- Offers excellent electrical and mechanical characteristics
- UL467 tested – exceed performance requirements
- CSA Std C22.2 No 41 for 1/2" ground rods to 2-#6 AWG sol.

With the SnapTap® Connectors, you can achieve an electrically superior, pressure-fit connection in seconds without expensive tooling. The connector is also easy to disassemble, requiring only a flat-head screwdriver to release the connected body. A one-piece design keeps parts together, minimizing loss of components prior to assembly. Simply separate the pieces and snap them in place for installation. An audible "Snap" indicates that the connection is complete and properly installed.



Cat. No.	Conductor Description		Packaging		Std. Order Qty
	Main	Branch	Inner Pack	Outer Pack	
JP62*	#2 AWG Sol. Copper	#6 AWG Sol. Copper	20	200	200
JP66-TB*	#2 AWG Sol. Copper	#6 AWG Sol. Copper	20	200	200
JP146	1/4" Steel Stranded	#6 AWG Sol. Copper	20	200	200
JP5166	5/8" Steel Stranded	#6 AWG Sol. Copper	20	200	200
JP386	3/8" Steel Stranded	#6 AWG Sol. Copper	20	200	200
JP126	1/2" Steel Stranded	#6 AWG Sol. Copper	20	200	200
JP126G	1/2" Ground Rod	#6 AWG Sol. Copper	20	200	200
JP2614	1/4" Steel Stranded	2-#6 AWG Sol. Copper	20	200	200
JP26516	5/16" Steel Stranded	2-#6 AWG Sol. Copper	20	200	200
JP2638	3/8" Steel Stranded	2-#6 AWG Sol. Copper	20	200	200
JP2612G*	1/2" Ground Rod	2-#6 AWG Sol. Copper	20	200	200

NOTE: All Toolless Connectors are UL Listed. Only items with (\*) are CSA listed.

#### General Usage Instructions

##### Separate

No special tools required. Use ordinary parallel jaw pliers to separate the connector into two parts. Hold one side of connector with pliers and bend opposite side back and forth until parts separate (see **Fig. 1**).

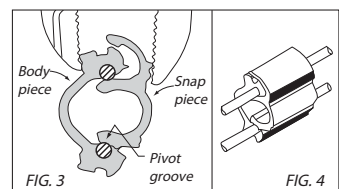
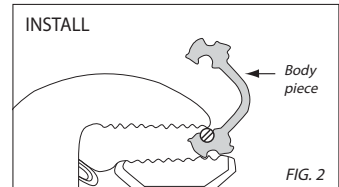
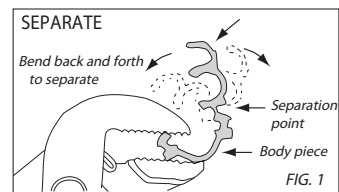
Caution: Be careful not to pinch fingers or thumb when separating parts. Keep fingers out of bend part when bending part against plier jaws.

##### Installation

1. Strip the insulation from each conductor. Be careful not to nick the conductor. Clean the conductor ends with a wire brush or emery cloth if necessary.
2. Place each conductor into the grooves in BODY piece. Press conductors with pliers to align and seat into grooves (see **Fig. 2**).
3. Hold the conductors and BODY piece until it closes. Use parallel jaw pliers and grip the SNAP and BODY pieces as shown (see **Fig. 3**). Apply pressure until connector "snaps" into place. Visually inspect snap to verify full insertion. The connection is now complete (see **Fig. 4**).

##### Removal

The connector can be disassembled using a flat-head screwdriver to pry the SNAP piece from BODY piece.



## Mechanical Grounding Connectors

G R O U N D I N G

### Type DS — Service Post Connectors, Short Stud

#### Application

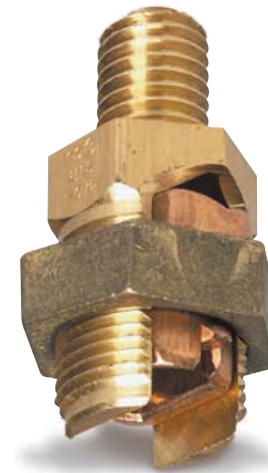
The Blackburn® line of Service Post Connectors is designed for applications including steel structure, fence post or transformer grounding involving one or two cables. Service Posts can also be used to tap one or two cables from bus bar.

#### Construction & Ratings

Bolts used in the Service Post are machined from high conductivity bronze alloy while the nuts are cold-formed from high strength, corrosion resistant copper alloy. Pressure bars are copper through 4/0 size, while copper alloy is used for 350 kcmil size and above. Bolts and nuts are of the traditional Blackburn® hex design for easy installation.

Service Post Connectors are available in sizes accommodating AWG copper conductor ranges of #12 – 500 kcmil stranded (4 mm<sup>2</sup> - 240 mm<sup>2</sup>) and #12-#2 solid (4 mm<sup>2</sup> - 35 mm<sup>2</sup>).

The line includes both short and long stud versions for single conductor and double conductor connectors.



- For copper to copper connections
- For grounding of steel structures, fence posts or transformers using one or two cables
- For tapping one or two cables from bus bar
- Hex design bolts are machined from high conductivity bronze alloy
- Nuts and pressure bars are cold-formed from high-strength copper or copper alloy



Cat. No.		Conductor Range Stranded (AWG/mm <sup>2</sup> )		Conductors Range Solid (AWG/mm <sup>2</sup> )		Maximum Diameter Range (in.)	Stud Size (in.)
Double Conductor	Single Conductor	max.	min.	max.	min.		
<b>SP0DS</b>	<b>SP0SS</b>	8 6 mm <sup>2</sup>	12 4 mm <sup>2</sup>	8 6 mm <sup>2</sup>	12 4 mm <sup>2</sup>	0.146–0.080	1/4–20 x 1/2
<b>SP1DS</b>	<b>SP1SS</b>	7 10 mm <sup>2</sup>	10 6 mm <sup>2</sup>	6 10 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.170–0.102	1/4–20 x 1/2
<b>SP2DS</b>	<b>SP2SS</b>	5 16 mm <sup>2</sup>	10 6 mm <sup>2</sup>	4 16 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.217–0.102	5/16–18 x 5/8
<b>SP3DS</b>	<b>SP3SS</b>	3 25 mm <sup>2</sup>	10 6 mm <sup>2</sup>	2 35 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.271–0.102	3/8–16 x 5/8
<b>SP4DS</b>	<b>SP4SS</b>	1 35 mm <sup>2</sup>	8 6 mm <sup>2</sup>	2 35 mm <sup>2</sup>	8 10 mm <sup>2</sup>	0.332–0.128	3/8–16 x 5/8
<b>SP5DS</b>	<b>SP5SS</b>	1/0 50 mm <sup>2</sup>	2 35 mm <sup>2</sup>	2 35 mm <sup>2</sup>	–	0.385–0.259	1/2–13 x 3/4
<b>SP6DS</b>	<b>SP6SS</b>	2/0 70 mm <sup>2</sup>	2 35 mm <sup>2</sup>	2 35 mm <sup>2</sup>	–	0.443–0.258	1/2–13 x 3/4
<b>SP8DS</b>	<b>SP8SS</b>	4/0 95 mm <sup>2</sup>	1 35 mm <sup>2</sup>	–	–	0.570–0.289	5/8–11 x 1
<b>SP9DS</b>	<b>SP9SS</b>	350 150 mm <sup>2</sup>	1/0 70 mm <sup>2</sup>	–	–	0.715–0.373	5/8–11 x 1
<b>SP10DS</b>	<b>SP10SS</b>	500 240 mm <sup>2</sup>	3/0 95 mm <sup>2</sup>	–	–	0.840–0.464	3/4–10 x 1-1/4

Physical dimensions can be found on page 10.

## Mechanical Grounding Connectors

### Type SP — Service Post Connectors, Long Stud

Grounding

- For copper to copper connections
- For grounding of steel structures, fence posts, transformers using one or two cables
- For tapping one or two cables from bus bar
- Hex design bolts are machined from high conductivity bronze alloy
- Nuts and pressure bars are cold-formed from high-strength copper or copper alloy
- Pressure bars are copper through 4/0 size; copper alloy is used for 350 kcmil size and above
- Available in sizes accommodating AWG copper conductor ranges of #12–500 kcmil stranded (4mm<sup>2</sup>–240mm<sup>2</sup>) and #12–#2 solid (4mm<sup>2</sup>–35mm<sup>2</sup>)
- Line includes single conductor and double conductor connectors



Cat. No.		Conductors Range Stranded (AWG/mm <sup>2</sup> )		Conductors Range Solid (AWG/mm <sup>2</sup> )		Maximum Diameter Range (in.)	Stud Size (in.)
Double Conductor	Single Conductor	max.	min.	max.	min.		
<b>SP0DL</b>	<b>SP0SL</b>	8 6 mm <sup>2</sup>	12 4 mm <sup>2</sup>	8 6 mm <sup>2</sup>	12 4 mm <sup>2</sup>	0.146–0.080	1/4–20 x 1/2
<b>SP1DL</b>	<b>SP1SL</b>	7 10 mm <sup>2</sup>	10 6 mm <sup>2</sup>	6 10 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.170–0.102	1/4–20 x 1/2
<b>SP2DL</b>	<b>SP2SL</b>	5 16 mm <sup>2</sup>	10 6 mm <sup>2</sup>	4 16 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.217–0.102	5/16–18 x 5/8
<b>SP3DL</b>	<b>SP3SL</b>	3 25 mm <sup>2</sup>	10 6 mm <sup>2</sup>	2 35 mm <sup>2</sup>	10 6 mm <sup>2</sup>	0.271–0.102	3/8–16 x 5/8
<b>SP4DL</b>	<b>SP4SL</b>	1 35 mm <sup>2</sup>	8 6 mm <sup>2</sup>	2 35 mm <sup>2</sup>	8 10 mm <sup>2</sup>	0.332–0.128	3/8–16 x 5/8
<b>SP5DL</b>	<b>SP5SL</b>	1/0 50 mm <sup>2</sup>	2 35 mm <sup>2</sup>	2 35 mm <sup>2</sup>	–	0.385–0.259	1/2–13 x 3/4
<b>SP6DL</b>	<b>SP6SL</b>	2/0 70 mm <sup>2</sup>	2 35 mm <sup>2</sup>	2 35 mm <sup>2</sup>	–	0.443–0.258	1/2–13 x 3/4
<b>SP8DL</b>	<b>SP8SL</b>	4/0 95 mm <sup>2</sup>	1 35 mm <sup>2</sup>	–	–	0.570–0.289	5/8–11 x 1
<b>SP9DL</b>	<b>SP9SL</b>	350 150 mm <sup>2</sup>	1/0 70 mm <sup>2</sup>	–	–	0.715–0.373	5/8–11 x 1
<b>SP10DL</b>	<b>SP10SL</b>	500 240 mm <sup>2</sup>	3/0 95 mm <sup>2</sup>	–	–	0.840–0.464	3/4–10 x 1-1/4

Physical dimensions can be found on page 11.

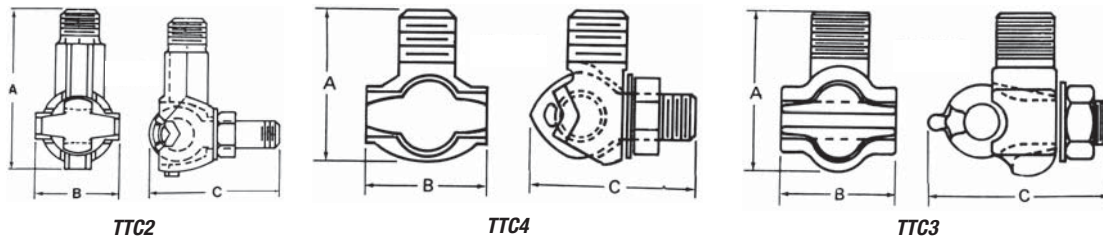
## Mechanical Grounding Connectors

### Type TTC — Transformer Tank Ground Connectors

- Transformer Grounding Connectors are cast of high conductivity bronze; 1/2"–13 stud fits all standard EEI-NEMA distribution transformers
- Eye bolt on TTC2 rotates to accommodate cable in either vertical or horizontal direction
- One size connector to handle full range of grounding conductors from #8 through 2/0 str.
- No special tools required



G R O U N D I N G



Cat. No.	Conductor Range				Stud Thread Size UNC-2A	Dimensions (in.)		
	max.	min.	max. (mm <sup>2</sup> )	min. (mm <sup>2</sup> )		A	B	C
<b>TTC2</b>	2/0 str.	8 sol.	67.4	8.3	1/2"–13	1-51/64	1-9/64	1-21/32
<b>TTC3</b>	1 str.	10 sol.	42.4	5.2	1/2"–13	1-3/8	1-3/64	1-9/16
<b>TTC4</b>	1 str.	10 sol.	42.4	5.2	1/2"–13	1-1/4	7/8	1-3/8
<b>TTC2P</b>	2/0 str.	8 sol.	67.4	8.3	1/2"–13	1-51/64	1-9/64	1-21/32
<b>TTC3P*</b>	1 str.	10 sol.	42.4	5.2	1/2"–13	1-3/8	1-3/64	1-9/16
<b>TTC4P*</b>	1 str.	10 sol.	42.4	5.2	1/2"–13	1-1/4	7/8	1-3/8

\* Tin Plated.

## Mechanical Grounding Connectors

### Conduit Hubs



Cat. No.	Ground Wire Size AWG	Conduit/Wire Size
<b>3930</b>	#8 to #2	1/2" Conduit
<b>3940</b>	#8 to #2	3/4" Conduit
<b>3950</b>	#8 to #3/0	1" Conduit
<b>3951</b>	#8 to #4/0	1-1/4" Conduit
<b>3960</b>	#8 to #4	Armored Wire

Material: Malleable iron.



Grounding

### Type CH — Bronze Conduit Hubs

- Rugged cast bronze threaded hubs
- Provide positive connection between rigid conduit and water system in conjunction with "J" clamp



Cat. No.	Conduit Size (in.)	Conductor Range	
		max.	min.
<b>CH12</b>	1/2	6 sol.	10 sol.
<b>CH34</b>	3/4	2/0 str.	10 sol.
<b>CH1</b>	1	3/0 str.	10 sol.



## Mechanical Grounding Connectors

### Flexible Braids for Continuous current, Grounding and Bonding Applications (i.e.: Cable Tray)

Standard construction using 30 AWG individual wires are suitable for medium duty applications. If needed, all constructions and/or configurations in this Guide, can be supplied using 36 AWG for extra flexibility.

#### Rating of the Connectors

It is important to note that the Ampere ratings in this Guide are suggested for use as a reference only. If needed, we can certify ampacity of all connectors in our top of the line automatic heat cycle laboratory using CEI60694 standards. Performance certificate gives you the assurance that our connectors are suitable for your application. Actual values used for a given application will depend on such factors as temperature rise, number of braids, voltage ratings and other conditions of service needs to be verified by application engineers.



#### Length of the assemblies

All braid lengths are measured in inches and are measured from end to end. The last digits of the part numbers determine the length of the connector. (i.e.: FBD12, "12" = 12 inches)



#### Ferrules and Plating

Ferrules are made of high conductivity seamless 99.9% pure copper that are electro-tin plated prior to forming on each end of the assembly. This procedure is important to eliminate surface corrosion between the inside of the ferrule and the braids before compression can affect the connector's performance.

For increased pad conductivity, 30, 50 or 100 micron silver plated ferrules are available. Nickel plating or bare copper also available upon request.



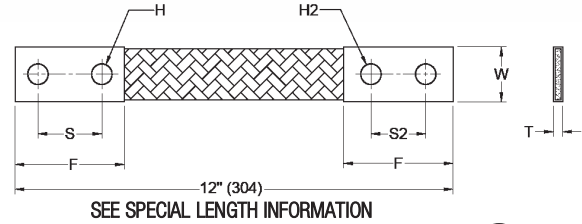
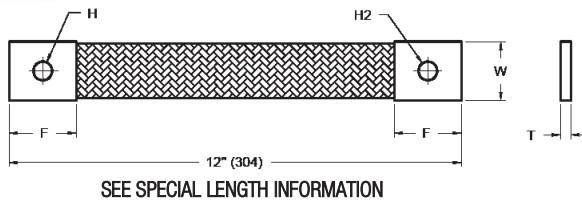
#### Options

For special requests, provide a copy of your drawing with your specific requirements so we can design and build the flexible connectors to your exact specifications.

If needed, a wide range of insulation products are available depending on the application, voltage and temperature ratings.



## Mechanical Grounding Connectors



Cat. No.	Circular Mils	Bolt Hole (H or H2)	No. of Braids in Ferrule	Dimensions in. (mm)			
				(T) Thickness	(W) Width	(F) Ferrule Length	(S or S2) Distance Ctr. to Ctr
FBB12-1*	24000	1/4	1	0.140 (3.6)	0.625 (15.9)	0.750 (19.1)	N/A
FBC12-1*	48000	7/16	1	0.148 (3.8)	1.000 (25.4)	1.300 (33.0)	N/A
FBD12-1*	76800	7/16	1	0.200 (5.1)	1.000 (25.4)	1.300 (33.0)	N/A
FBD12*	76800	7/16	1	0.200 (5.1)	1.000 (25.4)	2.500 (63.5)	1.25 (31.8)
FB2D12-1*	153600	7/16	2	0.250 (6.4)	1.250 (31.8)	1.500 (38.1)	N/A
FB2D12*	153600	7/16	2	0.250 (6.4)	1.250 (31.8)	2.500 (63.5)	1.25 (31.8)
FB3D12-1*	230400	7/16	3	0.350 (8.9)	1.250 (31.8)	1.500 (38.1)	N/A
FB3D12*	230400	7/16	3	0.350 (8.9)	1.250 (31.8)	2.500 (63.5)	1.25 (31.8)
FBXD12-1*	105600	9/16	1	0.250 (6.4)	1.250 (31.8)	1.500 (38.1)	N/A
FBXD12*	105600	9/16	1	0.250 (6.4)	1.250 (31.8)	2.500 (63.5)	1.25 (31.8)
FB2XD12-1*	211200	9/16	2	0.350 (8.9)	1.250 (31.8)	1.500 (38.1)	N/A
FB2XD12*	211200	9/16	2	0.350 (8.9)	1.250 (31.8)	2.500 (63.5)	1.25 (31.8)
FB3XD12-1*	316800	9/16	3	0.400 (10.2)	1.250 (31.8)	1.500 (38.1)	N/A
FB3XD12*	316800	9/16	3	0.400 (10.2)	1.250 (31.8)	2.500 (63.5)	1.25 (31.8)
FBE12-1*	168000	9/16	1	0.500 (12.7)	1.250 (31.8)	2.500 (63.5)	N/A
FBE12*	168000	9/16	1	0.250 (6.4)	1.250 (31.8)	3.500 (88.9)	1.75 (44.5)
FB2E12-1*	336000	9/16	1	0.500 (12.7)	1.250 (31.8)	2.500 (63.5)	N/A
FB2E12*	336000	9/16	2	0.500 (12.7)	1.250 (31.8)	3.500 (88.9)	1.75 (44.5)
FB3E12	504000	9/16	3	0.750 (19.1)	1.250 (31.8)	3.500 (88.9)	1.75 (44.5)
FB4E12	672000	9/16	4	1.000 (25.4)	1.250 (31.8)	3.500 (88.9)	1.75 (44.5)
FBF12	230400	9/16	1	0.300 (7.6)	1.500 (38.1)	3.500 (88.9)	1.75 (44.5)
FB2F12	460800	9/16	2	0.450 (11.4)	1.500 (38.1)	3.500 (88.9)	1.75 (44.5)
FB3F12	691200	9/16	3	0.600 (15.2)	1.625 (41.2)	3.500 (88.9)	1.75 (44.5)
FB4F12	921600	9/16	4	0.750 (19.1)	1.625 (41.2)	3.500 (88.9)	1.75 (44.5)
FBG12	307200	9/16	1	0.380 (9.7)	1.500 (38.1)	3.500 (88.9)	1.75 (44.5)
FB2G12	614400	9/16	2	0.630 (16.0)	1.625 (41.2)	3.500 (88.9)	1.75 (44.5)
FB3G12	921600	9/16	3	0.850 (21.6)	1.625 (41.2)	3.500 (88.9)	1.75 (44.5)
FB4G12	1228800	9/16	4	1.000 (25.4)	1.880 (47.9)	3.500 (88.9)	1.75 (44.5)

\* Listed UL 467 and 486A, certified CSA C22.2 No. 41 as Grounding and Bonding Equipment.  
 Special lengths offered in 6, 18, 24, 30 and 36 inches (end to end).  
 Change the 12 in the above catalogue numbers to the desired length.  
 (-1) indicates 1 bolt hole per ferrule.  
 S2 and H2 measurements are used for customized braids only.




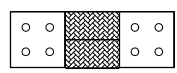
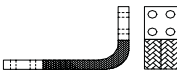







### Flexible Braids in a roll (10 feet minimum)

Cat. No.	Circular Mils	Thickness in. (mm)	Width in. (mm)
FBBRL	24000	0.140 (3.6)	0.625 (15.9)
FBCRL	48000	0.148 (3.8)	1.000 (25.4)
FBDRL	76800	0.200 (5.1)	1.000 (25.4)
FBXDRL	105600	0.250 (6.4)	1.250 (31.8)

Ferrules or lugs not included.  
 Add suffix for desired length, i.e.: FBCRL "-10" for 10' roll.

## Mechanical Grounding Connectors

### Technical Specifications

Configuration	Type	Ind. Wire Gauge Size	Width Range (in.)	Rating Range (Amps)	Comments
<b>Extra-flexible Links for Heavy-Duty Application</b>					
	<b>FBEXA</b>	36 AWG	1-1/2 – 1-5/8	350 – 1000 A	Extra Flexible 1 hole NEMA Boreal's Top of the line
	<b>FBEXB</b>	36 AWG	1-1/2 – 1-5/8	400 – 2000 A	Extra Flexible 2 hole NEMA Boreal's top of the line
	<b>FBEXG</b>	36 AWG	1-3/4 – 2	900 – 1650 A	Extra Flexible Transformer Link
	<b>FBEXH</b>	36 AWG	3 – 4	1400 – 4000 A	Extra Flexible 4 hole NEMA Boreal's top of the line
	<b>FBEXJ</b>	36 AWG	3-1/4 – 3-3/4	2300 – 3600 A	Extra Flexible 90° 4 hole NEMA Boreal's top of the line
<b>Standard flexible Links for Medium-Duty Application</b>					
	<b>FBB**-1 FBC**-1 FBD**-1</b>	30 AWG	1-1/4 – 1-3/4	350 – 1000 A	NEMA std. Grounding Connectors
	<b>FBD** FB2D** FB3D** FBXD** FB2XD**</b>	30 AWG	1-1/2 – 1-5/8	400 – 2000 A	Same as EXB with 30 AWG wires
		30 AWG	1-1/2 – 2	700 – 1750 A	Standard Transformer Link
	<b>FBSWB</b>	30 AWG	1-1/2 – 2	700 – 1750 A	Same construction as SWB with different hole pattern
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	4 hole pads also available in wider configuration, refer to EXH, SWD and LTL series
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC Type A with different hole configuration
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC Type A with different hole configuration
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC Type A with different hole configuration

\*\* Specify desired length.

## Mechanical Grounding Connectors

### Technical Specifications

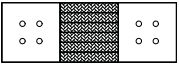

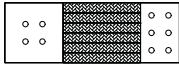

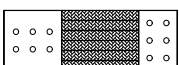

Grounding

Configuration	Type	Ind. Wire Gauge Size	Width Range (in.)	Rating Range (Amps)	Comments
<b>Standard Flexible Links for Medium-Duty Application</b>					
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC with different hole configuration
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC with different hole configuration
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC with different hole configuration
	<b>FBSWC</b>	30 AWG	3	1300 – 2350 A	Same construction as SWC with different hole configuration
	<b>FBSWC</b>	30 AWG	2 – 4	600 – 1850 A	Same construction as SWC with different hole configuration
	<b>FBSWD</b>	30 AWG	3-3/4 – 4-3/4	1600 – 2100 A	4 hole Transformer Link
	<b>FBSWC</b>	30 AWG	3	1300 – 2100 A	1 to 4 hole Transformer Link
	<b>FBSWD</b>	30 AWG	3-3/4 – 4-3/4	1300 – 2100 A	1 to 4 hole Transformer Link
	<b>FBSWD</b>	30 AWG	3-3/4 – 4-3/4	1600 – 2100 A	2 to 4 hole Transformer Link
	<b>FBSWD</b>	30 AWG	3-3/4 – 4-3/4	1600 – 2100 A	3 to 4 hole Transformer Link
	<b>FBSWE</b>	30 AWG	3	1400 – 1600 A	6 to 4 hole Transformer Link
	<b>FBSWF</b>	30 AWG	3-3/4 – 4-3/4	1700 – 2300 A	6 to 4 hole Transformer Link
	<b>FBSWE</b>	30 AWG	3	1400 – 1600 A	6 hole Transformer Link
	<b>FBSWF</b>	30 AWG	3-3/4 – 4-3/4	1700 – 2300 A	6 hole Transformer Link

## Mechanical Grounding Connectors




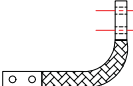
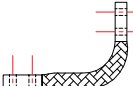
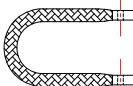




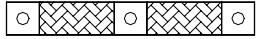
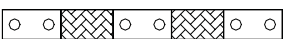
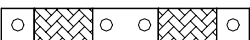
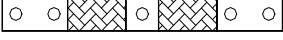
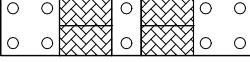
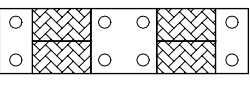
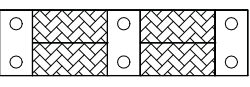
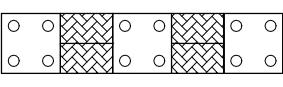
### Technical Specifications

G r o u n d i n g

Configuration	Type	Ind. Wire Gauge Size	Width Range (in.)	Rating Range (Amps)	Comments
<b>Large Transformer Links</b>					
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	4 hole Transformer Link
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	4 to 6 hole Transformer Link
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	4 to 6 hole Transformer Link
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	6 hole Transformer Link
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	6 hole Transformer Link
	FBLTL	30 AWG	6 – 6-3/8	2500 – 4000 A	6 hole Transformer Link

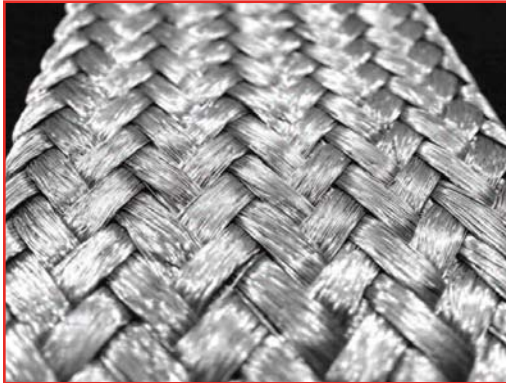
### Miscellaneous Configurations and Shapes

The following sketches represent the most popular configurations and shapes. For other non standard flexible links and/or dimensions, send us a copy of your drawing with your specific requirements so that we can design and build the flexible connectors to your exact specification.

	Model FBBI Type A		Model FBBI Type B		Model FBBL Type A
	Model FBBL Type B		Model FBBL Type C		Model FBBU Type A
	Model FBBU Type B		Model FBBU Type C		Model FBBY Type A
	Model FBBY Type B		Model FBBE Type A		Model FBBE Type B
	Model FBBE Type C		Model FBBE Type D		Model FBBE Type E
	Model FBBE Type F		Model FBBE Type G		Model FBBE Type H

## Mechanical Grounding Connectors

Grounding



### Conductors

Strands are soft-drawn bare or tinned copper.

### Construction

Strands are woven into a tubular braid and rolled flat.

### Application

For bonding, grounding or connecting moving parts.

### Specification

ASTM-B33

### Assemblies

Factory Installed molded connectors also available.

*The following listing represents the most popular flat braid constructions used in specialized electrical industry applications. For other constructions, contact a T&B sales representative or your regional T&B sales office.*

Cat. No.	AWG Size	Circular Mil Area	Numbers and Size of Wires	Construction	Nominal Width (in.)	Nominal Thick. (in.)	Approx. Weight (lb./m)
<b>FB-4243230-1*</b>	300 kcmil	307,200	3,072 / 30	4 x (24 x 32/30)	1-3/8	0.420	1,110
<b>FB-1485230-1</b>	250 kcmil	249,600	2,496 / 30	48 x 52/30	2-1/2	0.190	900
<b>FB-3243230-1</b>	4/0	230,400	2,304 / 30	3 x (24 x 32/30)	1-1/4	0.375	825
<b>FB-2243230-1</b>	3/0	153,600	1,536 / 30	2 x (24 x 32/30)	1-1/8	0.250	560
<b>FBXDRL</b>	1/0	105,600	1,056 / 30	24 x 44/30	1	0.135	365
<b>FB-1482230-1</b>	1/0	105,600	1,056 / 30	48 x 22/30	1-3/8	0.120	365
<b>FB-1488436-1</b>	1/0	100,800	4,032 / 36	48 x 84/36	1-5/8	0.080	360
<b>FBDRRL</b>	1	76,800	768 / 30	24 x 32/30	1	0.125	200
<b>FB-12412036-1</b>	2	72,000	2,880 / 36	24 x 120/36	1	0.135	240
<b>FB-1485036-1</b>	2	60,000	2,400 / 36	48 x 50/36	1-1/4	0.090	205
<b>FBRCRL</b>	3	48,000	480 / 30	24 x 20/30	3/4	0.110	170
<b>FB-1484036-1</b>	3	48,000	1,920 / 36	48 x 40/36	1	0.090	160
<b>FB-1488640-1</b>	4	41,280	4,128 / 40	48 x 86/40	1	0.060	140
<b>FB-1246736-1</b>	4	40,200	1,608 / 36	24 x 67/36	3/4	0.090	135
<b>FB-1241630-1</b>	4	38,400	384 / 30	24 x 16/30	5/8	0.085	125
<b>FBDRRL</b>	6	24,000	210 / 30	24 x 10/30	1/2	0.080	83
<b>FB-1244036-1</b>	6	24,000	960 / 36	24 x 40/36	1/2	0.090	80
<b>FB-14810644-2</b>	7	20,350	5,088 / 44	48 x 106/44	5/8	0.050	68
<b>FB-1480836-1</b>	10	9,600	384 / 36	48 x 8/36	1/2	0.030	39
<b>FB-1241636-1</b>	10	9,600	384 / 36	24 x 16/36	3/8	0.060	39
<b>FB-1480636-1</b>	12	7,200	288 / 36	48 x 6/36	3/8	0.030	28
<b>FB-1481036-1</b>	12	6,000	240 / 36	24 x 10/36	1/4	0.030	23

\*The suffix "-1" denotes tinned copper braid. For bare copper braid, replace "-1" with "-2".  
NOTE: Dimensions shown are only approximate due to the extreme flexibility of braided cables.

## Mechanical Grounding Connectors

### Conductors

Strands are soft-drawn bare or tinned copper.

### Construction

Strands are woven into a tubular braid.

### Application

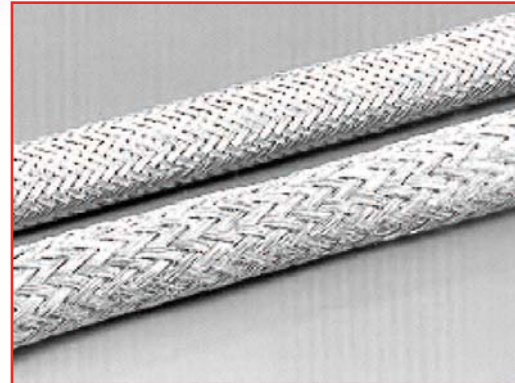
For bonding, grounding or connecting moving parts.

### Specification

ASTM-B33, QQ-B-375

### Shield Coverage

Braid is formed to maintain coverages of 90% shielding over the nominal diameters specified.



G R O U N D I N G

*The following listing represents the most popular tubular braid constructions used in today's electrical and electronic industries. For other constructions, contact a T&B sales representative or your regional T&B sales office.*

Cat. No.	Nominal I.D. when Rounded	Nominal Circular Mil Area	AWG Size Equivalent	Number and Size of Wires	Construction	Approx. Weight (lb./m)
<b>TB - 481630</b>	2-1/4	77,180	1	768 / 30	48 x 16 / 30	260
<b>TB - 481430*</b>	2	67,540	2	672 / 30	48 x 14 / 30	230
<b>TB - 481230*</b>	1-1/2	57,890	3	576 / 30	48 x 12 / 30	200
<b>TB - 481130*</b>	1-3/8	53,060	3	528 / 30	48 x 11 / 30	185
<b>TB - 481030</b>	1-1/4	48,240	3	480 / 30	48 x 10 / 30	168
<b>TB - 480930*</b>	1-1/8	43,420	4	432 / 30	48 x 9 / 30	155
<b>TB - 480830*</b>	1	38,600	4	384 / 30	48 x 8 / 30	140
<b>TB - 480730*</b>	7/8	33,770	5	336 / 30	48 x 7 / 30	123
<b>TB - 481234</b>	13/16	22,896	7	576 / 34	48 x 12 / 34	85
<b>TB - 481836*</b>	25/32	21,600	7	864 / 36	48 x 18 / 36	79
<b>TB - 480734*</b>	1/2	13,356	9	336 / 34	48 x 7 / 34	53
<b>TB - 481136*</b>	1/2	13,200	9	528 / 36	48 x 11 / 36	53
<b>TB - 240730*</b>	3/8	16,880	8	168 / 30	24 x 7 / 30	62
<b>TB - 480836*</b>	3/8	9,600	10	384 / 36	48 x 8 / 36	40
<b>TB - 240834</b>	3/8	7,632	11	192 / 34	24 x 8 / 34	30
<b>TB - 241336*</b>	13/64	7,800	11	312 / 36	24 x 13 / 36	31
<b>TB - 240734</b>	1/4	6,678	12	168 / 34	24 x 7 / 34	26
<b>TB - 240536*</b>	1/8	3,000	15	120 / 36	24 x 5 / 36	13
<b>TB - 240436*</b>	7/64	2,400	16	96 / 36	24 x 4 / 36	11

\* Denotes QQ-B-575 construction.

NOTE: Because Tubular Braid is very pliable, the I.D.'s are approximate.

## Mechanical Grounding Connectors

### Flexible Braids Selection Guide

#### Minimum Size Flexible Braid for Continuous Current Applications



Cat. No.	Circular Mils	Amperage Capacity
FBB12-1	24000	95
FBC12-1	48000	145
FBD12-1	76800	190
FBD12	76800	190
FB2D12-1	153600	330
FB2D12	153600	630
FB3D12-1	230400	470
FB312	230400	470
FBXD12-1	105600	235
FBXD12	105600	235
FB2XD12-1	211200	400
FB2XD12	211200	400
FB3XD12-1	316800	600
FB3XD12	316800	600

Cat. No.	Circular Mils	Amperage Capacity
FBE12-1	168000	340
FBE12	168000	340
FB2E12-1	336000	530
FB2E12	336000	530
FB3E12	504000	700
FB4E12	672000	805
FBF12	230400	360
FB2F12	460800	600
FB3F12	691200	820
FB4F12	921600	1000
FBG12	307200	415
FB2G12	614400	700
FB3G12	921600	760
FB4G12	1228800	1200

### Grounding and Bonding Information

#### Minimum Size Conductors for Bonding Raceways and Equipment

Rating or Setting of overcurrent Device in Circuit Ahead of Equipment, Conduit, etc. Not Exceeding – Amperes	Copper Wire Circular Mils
200	26 240 (6 AWG)
300	41 740 (4 AWG)
400	52 620 (3 AWG)
500	66 360 (2 AWG)
600	83 690 (1 AWG)
800	105 600 (1/0)
1000	133 100 (2/0)
1200	167 800 (3/0)
1600	211 600 (4/0)
2000	250 000
2500	350 000
3000	400 000
4000	500 000
5000	700 000
6000	800 000

Based on table 16 C.E.C.

#### Minimum Size of Bare Copper Grounding Conductors

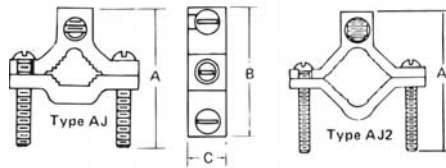
Maximum Available Short Circuit Current Amperes	Maximum Fault Duration with Exothermic Weld, Compression or Bolted Joint	
	0.5 Second Circular Mils	1.0 Second Circular Mils
5000	26 240	41 740
10 000	52 620	83 690
15 000	83 690	105 600
20 000	105 600	167 800
25 000	133 100	211 600
35 000	211 600	250 000
40 000	211 600	300 000
50 000	250 000	350 000
60 000	30 000	500 000
70 000	350 000	600 000
80 000	400 000	600 000
90 000	500 000	700 000
100 000	500 000	700 000

Based on table 51 C.E.C.  
Size calculated in accordance with IEEE No. 80.

## Mechanical Grounding Connectors

### Aluminum Water Pipe Clamps

- For connecting grounding conductor to either steel or copper pipe, rod or tubing
- Tin plated for corrosion resistance
- For use with copper or aluminum conductors



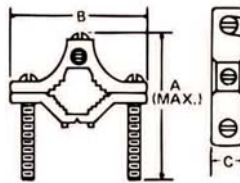
Grounding

Cat. No.	Water Pipe Size (in.)	Conductor Range		Dimensions (in.)			Steel Clamp Screw	Aluminum Wire Screw
		max.	min.	A	B	C		
<b>AJ</b>	1/2-1	1/0 str.	#14 sol.	2-1/2	2-1/4	5/8	1/4-20	7/16-20 slot
<b>AJ2</b>	1-1/2-2	250 kcmil	#6	3-7/8	3-3/4	7/8	5/16-18	11/16-20 socket
<b>AJ-2124</b>	2-1/2-4	250 kcmil	#6	5-9/16	6-5/16	7/8	3/8-16	11/16-20 socket

For both copper and aluminum conductors to steel pipe and copper water tubing.

### Budget Price Cast Bronze Clamp

- For connecting grounding conductor to either steel or copper pipe, rod or tubing
- For use with copper conductors only

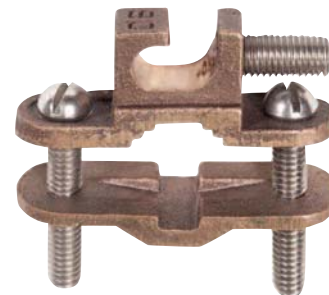


Cat. No.	Water Pipe Size (in.)	Conductor Range		Dimensions (in.)		
		max.	min.	A	B	C
<b>JJR</b>	1/2-1	#4 str.	#10 sol.	2-15/32	25/32	17/32

Lay-in feature reduces installation time for difficult bends or continuous loops of ground wire.

### Type JDLI — Direct Burial Ground Clamp

- UL Listed for direct burial in earth/concrete.
- UL Listed for connection to ground rod, pipe or rebar up to 1".
- Constructed from bronze alloy and high-performance stainless steel bolts.
- Designed for easy installation on difficult bends or continuous loops.



Cat. No.	Pipe Size	Rebar Size	Ground Rod Size	Conductor Range	Mech. Conn./Splice (UL Listed)
<b>JDLI</b>	1/2"-1"	3/8"-1"	1/4"-1"	#10 sol.-#2 Str.	(2) #8 sol.



## Mechanical Grounding Connectors

### Waterpipe Ground Clamps

Grounding



Cat. No.	Ground Wire Size	Water Pipe Size
<b>2-TB</b>	#6, #4, #2	1/2", 3/4", 1" or rebar 4-10
<b>3-TB</b>	#6, #4, #2	1-1/4", 1-1/2" or 2"
<b>4</b>	#6, #4, #2	2-1/2", 3" or 3-1/2"
<b>5-TB</b>	#6, #4, #2	4", 4-1/2" or 5"
<b>6</b>	#6, #4, #2	6"

Malleable iron crossbar, steel U-Bolt c/w copper cable clamp with serrations.



Cat. No.	Ground Wire Size	Water Pipe Size
<b>3902</b>	#4-4/0 AWG	1/2"-1"
<b>3903</b>	#4-4/0 AWG	1-1/4"-2"
<b>3904</b>	#4-4/0 AWG	2-1/2"-3-1/2"
<b>3905-TB</b>	#4-4/0 AWG	4"-5"
<b>3906-TB</b>	#4-4/0 AWG	6"
<b>3907</b>	#4-4/0 AWG	8"
<b>3908</b>	#4-4/0 AWG	10"
<b>3909-TB</b>	#4-4/0 AWG	12"

Material: Steel U-bolt and nut c/w bronzed aluminum cap and crossbar cadmium plated plus gold chromate finish.



Cat. No.	Ground Wire Size	Water Pipe Size
<b>3902BU*</b>	#4-4/0 AWG	1/2"-1"
<b>3903BU*</b>	#4-4/0 AWG	1-1/4"-2"
<b>3904BU*</b>	#4-4/0 AWG	2-1/2"-3-1/2"
<b>3905BU*</b>	#4-4/0 AWG	4"-5"
<b>3906BU*</b>	#4-4/0 AWG	6"
<b>3907BU*</b>	#4-4/0 AWG	8"
<b>3908BU*</b>	#4-4/0 AWG	10"
<b>3909BU*</b>	#4-4/0 AWG	12"

Material: Bronze U-bolt and nut c/w bronzed aluminum cap and crossbar with a bright dip finish.  
\*UL Listed for Direct Burial.