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Jumpering and grounding equipment and assemblies

Contents

Cooper Power Systems
by EATON

Load pickup clamps for 15 kV systems, 300 A maximum

Application information

The load pickup/jumper clamp set is used to establish a circuit between energized and nonenergized sections of the line. The load pickup clamp is intended for use in conjunction with a companion jumper clamp by means of a suitable length of properly sized flexible jumper cable. **It is not a load breaking device.**

Design features

- **Arc resistant** – integral, completely enclosed quick-make contacts minimize arcing between conductor and clamp.
- **Fast, positive loadmake** – heavy-duty closing spring insures positive connection up to 300 A.
- **Easy inspection** – a unique transparent, yellow tinted polycarbonate handle permits easy inspection of the contact and affords high dielectric, impact strength and durability.
- **Secure connection** – the knurled, floating washer-type upper contact offers greater contact area and a secure connection to the conductor when the clamp is tightened during installation.

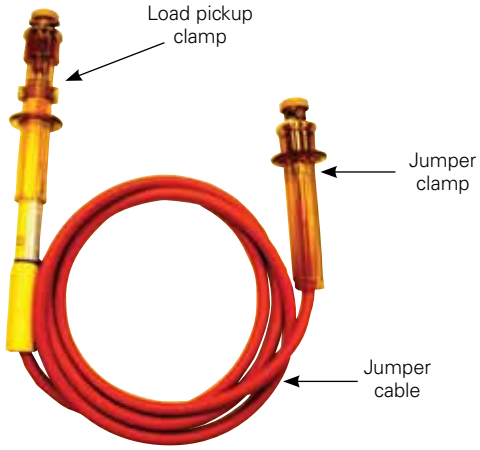

Figure 1. Load pickup clamp jumper assembly.

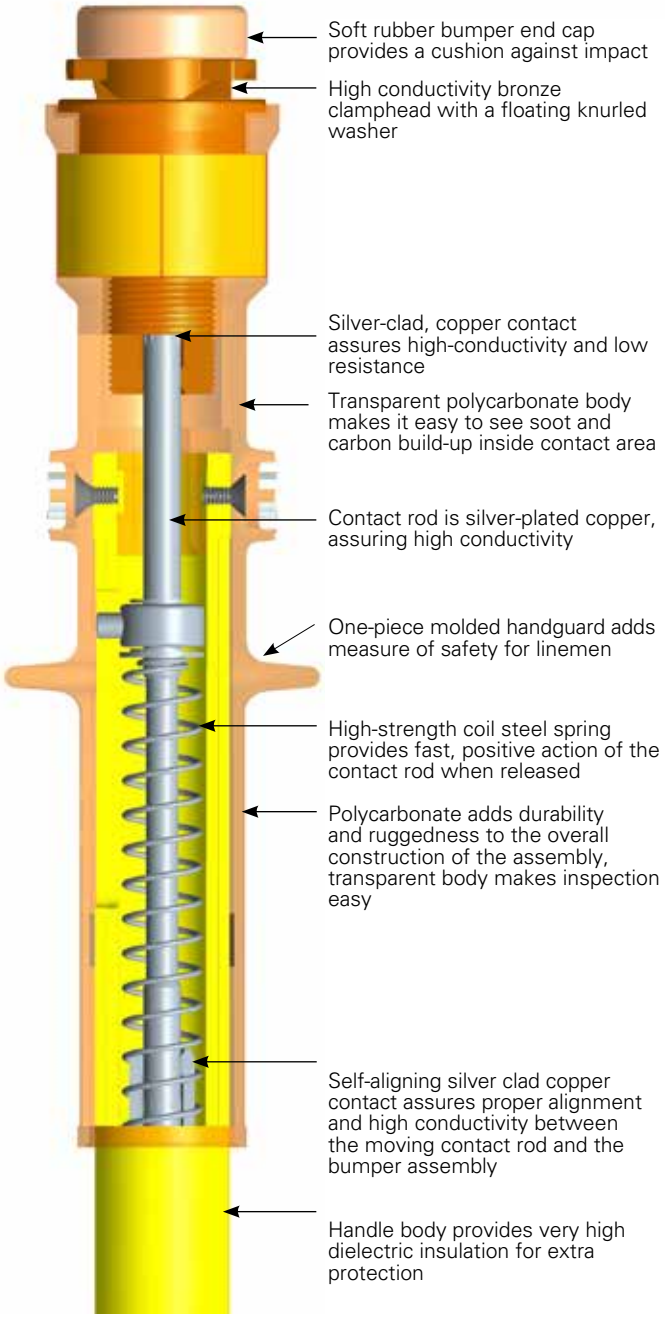

Figure 2. Load pickup clamp (cutaway view).

Table 1. Ratings

Max. Current Rating* (A)	Max. Phase-to-Phase Voltage	Max. Phase-to-Ground Voltage	Conductor Range Minimum	Conductor Range Maximum	Jumper Cable**
300 A	15 kV	8.3 kV	# 6 Sol.	800 KCMIL Str. or 795 KCMIL 26/7 ACSR	#2, 1/0 or 2/0

* Rating limited to the rating of cable installed.

** Use of cable not shown in table is not recommended.

Table 2. Load Pick-Up Clamp Jumper Assembly (Part Number Construction Information)

Digits	1	2	3	4	5	6	7	8	9	10
	L	**P**	**1**	**5**	**1**	**0**	**1**	**2**	**F**	**T**

Digits 1 and 2	
LP	Load Pickup Jumper

Digits 3 and 4 Voltage	
15	15 kV

Digits 5 and 6 Cable Size	
02	#2 Cable
10	1/0 Cable
20	2/0 Cable

Digit 7 - 10 Cable Length	
08FT	8 feet
10FT	10 feet
12FT	12 feet
14FT	14 feet
15FT	15 feet
16FT	16 feet
20FT	20 feet

Jumper clamps for 15 kV, 25 kV, 35 kV systems, 400 A maximum

Application information

A jumper clamp provides a temporary connection between lines of like potential when necessary to bypass construction, maintenance or equipment repair areas. It is used in two ways – in pairs joined by appropriately sized cable to provide temporary jumpering or in conjunction with a load pickup clamp to jumper between energized and nonenergized circuits.

Design features

- **Maximum flexibility** – the contoured contact surface of the bronze head accepts a wide range of conductors.
- **Improved conductivity** – the knurled, floating washer-type, contact of the head provides a greater contact surface area and prevents damage to the conductor when the clamp is tightened during installation.
- **Rugged design** – the transparent, polycarbonate handle provides impact strength and durability.
- **Cable protection** – the handle fully encloses the cable and protects connection and the screw threads. A smooth inner lining minimizes cable damage from abrasion and sharp bends.
- **Easier installation** – install quickly and easily on the line with one hand by hooking the open contact head over the conductor and rotating the handle to tighten the clamp.
- **Easier operation** – ribs formed in the handle afford a better gripping surface when tightening connections.

The knurled, floating washer-type contact cuts through oxide and into conductor for enhanced conductivity. It does not damage the conductor.

Figure 3. Clamp shown in open position.

Figure 4. Jumper clamp set assembly.

Table 3. Jumper Clamp Set Assemblies; Complete Set

Digits	1	2	3	4	5	6	7	8	9	10
	J	**C**	**1**	**5**	**1**	**0**	**1**	**2**	**F**	**T**

Digits 1 and 2	
JC	Jumper Clamp Assembly

Digits 3 and 4 Voltage	
15	15 kV
25	25 kV
35	35 kV

Digits 5 and 6 Cable Size	
02	#2 Cable
10	1/0 Cable
20	2/0 Cable
40	4/0 Cable

Digit 7 - 10 Cable Length	
08FT	8 feet
10FT	10 feet
12FT	12 feet
14FT	14 feet
15FT	15 feet
16FT	16 feet
20FT	20 feet

Note: Jumper Clamp Sets include clamps, ferrules and cable.

Jumper components

To facilitate maintenance, Eaton's Cooper Power Systems provides high-quality replacement parts. The following components will simplify maintenance and help to prolong equipment life.

Figure 5. Jumper cable and ferrule assembly.

Table 4. Jumper Cable and Ferrule Assembly

Digits	1	2	3	4	5	6	7	8	9
	J	**1**	**5**	**1**	**0**	**1**	**2**	**F**	**T**

Digit 1	
J	Jumper Cable & Ferrule Assembly

Digits 2 and 3 Voltage	
15	15 kV
25*	25 kV
35*	35 kV

* Use only with Jumper Clamp Assemblies

Digits 4 and 5 Cable Size	
02	#2 Cable (15 kV Only)
10	1/0 Cable (15.25 and 35 kV)
20	2/0 Cable (15 and 25 kV Only)
40*	4/0 Cable (15 kV Only)

* Use only with Jumper Clamp Assemblies

Digit 6 - 9 Cable Length	
08FT	8 feet
10FT	10 feet
12FT	12 feet
14FT	14 feet
15FT	15 feet
16FT	16 feet
20FT	20 feet

Figure 6. Ferrule installed on cable.

Table 5. Copper Jumper Cable – EPR†

kV	Size AWG	No. of Strands	Lay up of Strands	Approx. O.D. (Inches)	Approx. Current Rating (Amperes)*	Catalog Number
15	#2	259	7 x 37	0.780	200	3806-002
	1/0	259	7 x 37	0.865	250	3806-010
	2/0	259	7 x 37	0.910	300	3806-020
	4/0	437	19 x 23	1.052	400	3806-040
25	1/0	413	7 x 59	1.113	260	3806-110
	2/0	266	7 x 38	1.116	300	3806-120
35	1/0	413	7 x 59	1.267	260	3806-210

† Specify length when ordering.

* Based on copper temperature of 85 °C and ambient of 40 °C.

Table 6. Ferrules, Copper Compression Type

Cable Size	To Install on Cable with WH Tools		To install on Cable with Burndy® Y35 Tool*		
	Die No.	No. of Indents	Die Index No.	No. of Indents	Catalog Number**
#2	9/16	3	164	3	30365-1
1/0	9/16	3	164	3	30365-2
2/0	5/8-1	3	165	3	30365-3
4/0	840	3	168	3	30365-4

* Instructions are stamped on ferrule.

** Includes nut and washer as shown in Figure 6.

Table 7. Jumper Clamp (clamp only)

Handle Length	Line Range		For Jumper Cable Sizes	Max. Current. Rating*(Amperes)	Catalog Number
	Minimum.	Maximum.			
11 1/8"	#6 Sol.	795 KCMIL ACSR or 800 KCMIL Str.	#2, 1/0 , 2/0, 4/0	400	132284

Note: Catalog #132282 has been replaced with #132284.

*Rating applies to clamp only. In application, cable size and insulation rating must also be considered.

C-Type grounding clamps

Eaton's Cooper Power Systems offers a wide variety of grounding clamps in various styles and sizes for different applications. Because of the of diversity of products, users are assured of being able to select the exact clamp for the application. Grounding sets can be supplied assembled to your specifications. Consult your Eaton's Cooper Power Systems representative or the factory.

Design Features

Three general design considerations offer maximum application versatility:

- **Aluminum or bronze construction** – for the best conductivity regardless of conductor material
- **A variety of sizes to fit any job**
- **Sized for the job** – small clamps, ASTM rating 4, ultimate 47,000 A for 15 cycles; medium clamps, ASTM rating 5, ultimate 60,000 A for 15 cycles; large clamps, ASTM rating 6, ultimate 70,000 A for 15 cycles.
- **Resists burring and stripping** – brass eye screws have Acme threads.
- **Superior strain relief** – via stainless steel cable clamps.
- **Economical maintenance** – replaceable serrated jaw inserts save time and money.
- **Better conductivity and corrosion resistance** – brass jaw seats are plated when used in aluminum clamps.
- **Mounting flexibility** – threaded ferrule holes available for $^{1}/_{2}$"-13 or $^{5}/_{8}$"-11 threaded ferrules.
- **Identification ease** – wire range and catalog number are clearly marked on each clamp.

Figure 7.
Cat. #133015-2AL (Aluminum), Sty. 15C
Cat. #13303-2BRZ (Bronze), Sty. 16C
Cat. #133035-8AL (Aluminum), Sty. 17C
Cat. #133035-8BRZ (Bronze), Sty. 18C

Figure 8.
Cat. #133034-2AL (Aluminum), Sty. 11C
Cat. #133034-2BRZ (Bronze), Sty. 12C
Cat. #133034-8AL (Aluminum), Sty. 13C
Cat. #133034-8BRZ (Bronze), Sty. 14C

Figure 9.
Cat. #3668-1 (Bronze), Sty. 1C
Cat. #3668-100 (Bronze), Sty. 2C
Cat. #3654-100 (Aluminum), Sty. 4C
Cat. #3654-101 (Aluminum), Sty. 5C

Figure 10.
Cat. #3620-2 (Aluminum), Sty. 21C
Cat. #3620-3 (Bronze), Sty. 22C

Figure 11.
Cat. #3688-2 (Aluminum), Sty. 20C

Figure 12.
Cat. #3669-100 (Bronze), Sty. 7C
Cat. #3655-1 (Aluminum), Sty. 8C
Cat. #3655-100 (Aluminum), Sty. 9C

Note: Please refer to Table 8 for grounding clamp styles.

Flat face grounding clamps

Eaton's Cooper Power Systems heavy-duty flat face ground clamps attach to flat metal surfaces such as busbars, towers, metal poles or other conductive structures.

Design features:

- **Aluminum or bronze construction** – for the best conductivity regardless of conductor material.
- **A variety of sizes fit any job**
- **Jaws with either smooth or serrated surfaces**
- **Sized for the job** – small clamps, ASTM rating 4, ultimate 47,000 A for 15 cycles; medium clamps, ASTM rating 5, ultimate 60,000 A for 15 cycles; large clamps, ASTM rating 6, ultimate 70,000 A for 15 cycles.
- **Resists burring and stripping** – brass eye screws have Acme threads, a superior thread design.
- **Superior strain relief** – via stainless steel cable clamps.
- **Better conductivity and corrosion resistance** – brass jaw seats are plated when used in aluminum clamps.
- **Mounting flexibility** – threaded ferrule holes available for $^{1}/_{2}$"-13 or $^{5}/_{8}$"-11 threaded ferrules.
- **Identification ease** – wire range and catalog number are clearly marked on each clamp.

Figure 13.
Cat. #133036-8AL (Aluminum), Sty. 4F
Cat. #133036-8BRZ (Bronze), Sty. 5F

Figure 16.
Cat. #3659 (Aluminum), Sty. 1F
Cat. #3673-100 (Bronze), Sty. 3F

Figure 14.
Cat. #133042-8AL (Aluminum), Sty. 6F
Cat. #133042-8BRZ (Bronze), Sty. 7F

Figure 17.
Cat. #3672-100 (Bronze), Sty. 2F

Miscellaneous clamps

Eaton's Cooper Power Systems also offers special locking clamp pliers. More information on the locking clamp pliers can be found on page 12.

Figure 15.
Cat. #133045CPS (Steel), Sty. 1LP

Note: Please refer to Table 8 for grounding clamp styles.

Grounding clamps

Table 8. Grounding Clamp Styles

Clamp Style	Material	Clamp Range	Cable Range	ASTM Rating 15 Cycle Withstand	Eye Screw Thread	Ferrule Thread Type	Figure	Catalog Number
1C	Bronze	#8 Sol. to 1" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2" Thru Hole	9	3668-1
2C	Bronze	#8 Sol. to 1" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	9	3668-100
4C	Aluminum	#8 Sol. to 1" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	9	3654-100
5C	Aluminum	#8 Sol. to 1" dia.	#2 to 4/0	4 (34 kA)	Acme	1/2-13	9	3654-101
7C	Bronze	#8 Sol. to 2" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	12	3669-100
8C	Aluminum	#8 Sol. to 2" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2" Thru Hole	12	3655-1
9C	Aluminum	#8 Sol. to 2" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	12	3655-100
21C	Bronze	#8 Sol. to 1-3/8" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	10	3620-2
22C	Bronze	#8 Sol. to 1" dia.	#2 to 4/0	4 (34 kA)	Fine	1/2-13	10	3620-3
15C	Aluminum	#8 Sol. to 1" dia.	#2 to 250 MCM	5 (43 kA)	Acme	1/2-13	7	133035-2AL
16C	Bronze	#8 Sol. to 1" dia.	#2 to 250 MCM	5 (43 kA)	Acme	1/2-13	7	133035-2BRZ
17C	Aluminum	#8 Sol. to 1" dia.	#2 to 250 MCM	5 (43 kA)	Acme	5/8-11	7	133035-8AL
18C	Bronze	#8 Sol. to 1" dia.	#2 to 250 MCM	5 (43 kA)	Acme	5/8-11	7	133035-8BRZ
20C	Aluminum	#6 Sol. to 5" dia.	#2 to 4/0	5 (43 kA)	Acme	1/2-13	11	3688-2
11C	Aluminum	#8 Sol. to 2" dia.	#2 to 250 MCM	6 (54 kA)	Acme	1/2-13	8	133034-2AL
12C	Bronze	#8 Sol. to 2" dia.	#2 to 250 MCM	6 (54 kA)	Acme	1/2-13	8	133034-2BRZ
13C	Aluminum	#8 Sol. to 2" dia.	#2 to 250 MCM	6 (54 kA)	Acme	5/8-11	8	133034-8AL
14C	Bronze	#8 Sol. to 2" dia.	#2 to 250 MCM	6 (54 kA)	Acme	5/8-11	8	133034-8BRZ
1F	Aluminum	#8 Sol. to 1-1/2" dia.	# 2 to 4/0	4 (34 kA)	Fine	1/2-13	16	3659
2F	Bronze	#8 Sol. to 1-1/2" dia.	# 2 to 4/0	4 (34 kA)	Fine	1/2-13	17	3672-100
3F	Aluminum	#8 Sol. to 1-1/2" dia.	# 2 to 4/0	4 (34 kA)	Fine	1/2-13	16	3673-100
4F	Aluminum	#8 Sol. to 2" dia.	# 2 to 250 MCM	4 (34 kA)	Acme	5/8-11	13	133036-8AL
5F	Bronze	#8 Sol. to 2" dia.	# 2 to 250 MCM	4 (34 kA)	Acme	5/8-11	13	133036-8BRZ
6F	Aluminum	#8 Sol. to 2" dia.	# 2 to 250 MCM	4 (34 kA)	Acme	5/8-11	14	133042-8AL
7F	Bronze	#8 Sol. to 2" dia.	# 2 to 250 MCM	4 (34 kA)	Acme	5/8-11	14	133042-8BRZ
1LP	Steel	.25" to 1.25" dia.	1/0 to 2/0	N/A	N/A	Bolted	15	133045CPS

* Electrical ratings are RMS, symmetrical.

Table 9. Grounding Clamp and Cable Assemblies Ordering Information

Digits	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	G	S	1	0	Y	0	6	F	T	5	8	P	1	8	C	1	8	C

Digits 1 and 2

GS	Grounding Clamp and Cable Assy.

Digits 3 and 4 Voltage

02	#2 Cable
10	1/0 Cable
20	2/0 Cable
40	4/0 Cable

Digit 5 Cable Color

Y	Yellow
B	Black
C	Clear

Digit 10-12 Ferrule Type

58P	5/8-11 UNC Thread, plain
12P	1/2-13 UNC Thread, plain
12S	1/2-13 UNC Thread, shrouded
PSP	Plain Stud, No Shroud
PSS	Plain Stud, Shrouded

Digit 6 - 9 Cable Length

04FT	4 feet
05FT	5 feet
06FT	6 feet
08FT	8 feet
10FT	10 feet
12FT	12 feet
15FT	15 feet
20FT	20 feet
40FT	40 feet

Digit 13 - 18 Clamp Style

From Table 8 determine the clamp to be used for each end of the cable assembly. Fill in digit 13-18 using the Clamp Style numbers shown in the first column of the table. If the clamp style has only one number and one letter, i.e. 2C, add a 0 in front of the number: 02C.

Figure 18. Typical grounding clamp and cable assembly.

Copper ground cable

Eaton's Cooper Power Systems copper grounding cable is available in black, clear and yellow for easy color-coded identification. Our fine stranded copper cables are made of Class K rope lay for maximum flexibility and resistance against damage from bending. The clear jacket cable allows inspection of stranding to spot damage, corrosion or moisture.

When ordering in bulk please specify length. Maximum continuous length is 500 feet.

Table 10. Copper Ground Cables

					ASTM Ratings			
						Withstand Rating Symmetrical kA RMS 60 Hz		
Cable Size AWG	Jacket Type	Class K Stranding	Cable Dia.	Approx. Weight Per Ft.	Continuous Current A RMS 60 Hz	15 Cycles	30 Cycles	Catalog Number
Black Insulation								
# 2	Neoprene	665	0.337	.28 lbs.	200	14.5	10	3807
1/0	Neoprene	1064	0.423	.43 lbs.	250	21	15	3807-1
2/0	Neoprene	1323	0.508	.51 lbs.	300	27	20	3807-3
4/0	Neoprene	2107	0.645	.76 lbs.	400	43	30	3807-2
Clear Insulation								
# 2	PVC	665	0.337	.29 lbs.	200	14.5	10	3826-2
1/0	PVC	1064	0.423	.52 lbs.	250	21	15	3826-10
2/0	PVC	1323	0.508	.55 lbs.	300	27	20	3826-20
4/0	PVC	2107	0.645	.84 lbs.	400	43	30	3826-40
Yellow Insulation								
# 2	Neoprene	665	0.337	.28 lbs.	200	14.5	10	3827-2
1/0	Neoprene	1064	0.423	.43 lbs.	250	21	15	3827-10
2/0	Neoprene	1323	0.508	.51 lbs.	300	27	20	3827-20
4/0	Neoprene	2107	0.645	.76 lbs.	400	43	30	3827-40

* Electrical ratings are RMS, symmetrical.

Grounding components

Copper compression ferrules

Ferrules come threaded to match 1/2-13 or 5/8-11 ground clamps and conforms to ASTM F855 standards. Units come with a 6 inch length of transparent heat shrink tubing to provide extra protection against moisture, allow easy inspection of termination joints and provide strain relief. Other cable sizes, threading or plain studs can also be supplied to your specifications.

Shrouded ferrules are "sleeved" over the cable jacket, providing extra protection against flexing and the entrance of moisture into cable strands. Provided with 6 inch length of transparent heat shrink tubing.

Figure 19. Plain stud kit.

Figure 20. Typical threaded stud kit.

Table 11. Copper Compression Ferrules

Cable Size AWG	Ferrule Type	Ferrule Style	Kearney™ Installing Die	Burndy® Installing Die	Approx. Wt. (oz.)	ASTM Ratings Grade	Continuous Current A RMS 60 Hz	Withstand Rating Symmetrical kA RMS 60 Hz 15 Cycles	Withstand Rating Symmetrical kA RMS 60 Hz 30 Cycles	Catalog Number
5/8-11 UNC Thread										
# 2	Plain	58P	737	U677	4	1	200	14.5	10	133043-002
1/0	Plain	58P	840	U168	4.25	2	250	21	15	133043-010
2/0	Plain	58P	840	U168	5	3	300	27	20	133043-020
4/0	Plain	58P	840	U168	5.5	5	400	43	30	133043-040
250	Plain	58P	15/16	U161	6	6	450	54	39	133043-250
1/2-13 UNC Thread										
# 2	Plain	12P	9/16	U164	4	1	200	14.5	13	133023
1/0	Plain	12P	5/8-1	U165	4.25	2	250	21	15	133023-1
2/0	Plain	12P	5/8-1	U165	5	3	300	27	20	133023-2
4/0	Plain	12P	781	NE	5.5	5	400	43	30	133023-3
# 2	Shrouded	12S	9/16 Barrel 737 Shroud	U164 Barrel U677 Shroud	4.5	1	200	14.5	10	133011
1/0	Shrouded	12S	5/8-1 Barrel 840 Shroud	U165 Barrel U168 Shroud	5	2	250	21	15	133011-1
2/0	Shrouded	12S	5/8-1 Barrel 840 Shroud	U165 Barrel U168 Shroud	5	3	300	27	20	133011-2
4/0	Shrouded	12S	781 Barrel 840 Shroud	NE	5.5	5	400	43	30	133011-3
Plain Stud										
1/0	Plain	PSP	9/16	U164	4	2	250	21	15	135024-10
2/0	Shrouded	PSS	5/8-1 Barrel 840 Shroud	U165 Barrel U168 Shroud	5	3	300	27	20	133011-2ST
4/0	Shrouded	PSS	781 Barrel 840 Shroud	NE	5.5	5	400	43	30	133011-3ST

Grounding reels

Eaton's Cooper Power Systems grounding reel provides a simple, positive means for grounding line trucks or other vehicles parked in electrically hazardous areas. Inverse loop design silver-plated copper contacts provide electrical continuity from the reel to the grounding cable and insure maximum contact pressure under fault conditions. Compression terminals connect the cable to the reel and ground clamp.

Installation

All parts of a vehicle must be bonded to provide total electrical continuity to the reel base. The reel base should be attached to the vehicle with a continuous bead weld around the entire base.

For maximum protection, the ground clamp should be attached to the system neutral whenever possible. For conditions where there is no system neutral, a temporary ground rod can be used. Additional application, installation and test data is available on request.

Table 12. Calculated Volts Developed Across Reel (With 75 feet of Cable)

Cable Size AWG	Fault Current Symmetrical kA RMS 60 Hz	Cable Left on Reel		
		50 Feet	25 Feet	0 Feet
#2	5	185	110	110
	10	370	210	210
	15	550	325	325
	20	740	425	425
1/0	10	340	180	150
	15	510	275	225
	20	680	360	300
2/0	10	320	170	120
	15	480	250	175
	20	640	325	240
4/0	15	435	200	140
	20	580	260	180
	25	725	330	235

Cable

Grounding reels are furnished with copper welding cable having an insulation rated for 600 volts continuous operation. Cable sizes available are #2, 1/0, 2/0 and 4/0.

Tests and calculations indicate that a maximum cable length of 75 feet should be used on the reel and that a maximum of 50 feet of cable should remain on the reel when it is in use.

Also refer to Mounting, Maintenance and Recommended Use Practices TS-1455.

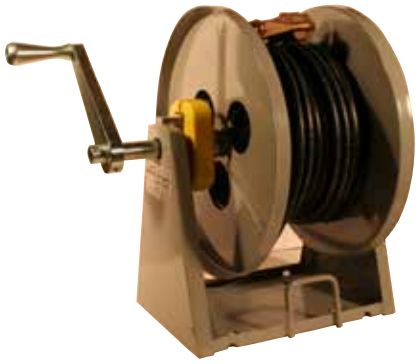

Figure 21. Grounding reel with Handle.

Table 13. Grounding Reel and Reels with Cable Ordering Information

Digits	1	2	3	4	5	6	7	8	9	10	11	12	13
	G	R	1	0	B	5	0	F	T	1	8	C	H

Digits 1 and 2

GR	Grounding Reel Assembly

Digit 5 Cable Color

Y	Yellow
B	Black
C	Clear
G	Green

Digits 10 - 12 Clamp Style

Select clamp from Table 8. Standard clamp is 18C. Put a 0 in digit 10 for clamps with numbers 1 through 9, i.e. 2C = 02C.
For Replacement cable use "RC" in digits 10-11.

Digits 3 and 4 Voltage

02	#2 Cable
10	1/0 Cable
20	2/0 Cable
40	4/0 Cable

Digits 6 - 9 Cable Length

30FT	30 feet
50FT	50 feet
75FT	75 feet

Digit 13 Optional

H	Handle

Table 14. Grounding Reel and Reels with Cable

Description	Ground Clamp	Cable Size	Cable Length	Approx. Wt. Each	Short Circuit Current Withstand Symmetrical kA RMS 60 Hz (Max. 50 ft. on Reel)		Catalog Number
					15 Cycles	30 Cycles	
Reel with Cable	133035-8BRZ	#2	75 ft.	74 lbs.	9.9	7	GR02B75FT18C
Reel with Cable	133035-8BRZ	#2	50 ft.	67 lbs.	9.9	7	GR02B50FT18C
Reel with Cable	133035-8BRZ	1/0	75 ft.	85 lbs.	15.5	11	GR10B75FT18C
Reel with Cable	133035-8BRZ	1/0	50 ft.	73 lbs.	15.5	11	GR10B50FT18C
Reel with Cable	133035-8BRZ	2/0	75 ft.	91 lbs.	18.5	14.5	GR20B75FT18C
Reel with Cable	133035-8BRZ	2/0	50 ft.	78 lbs.	18.5	14.5	GR20B50FT18C
Reel with Cable	133035-8BRZ	4/0	75 ft.	109 lbs.	24.5	17.5	GR40B75FT18C
Reel with Cable	133035-8BRZ	4/0	50 ft.	90 lbs.	24.5	17.5	GR40B50FT18C
Individual Components, Replacement Parts and Accessories							
Reel Only Less Cable and Clamp				49 lbs.	40	30	133041CPS
Reel With Handle Less Cable and Clamp				63 lbs.	40	30	133041H
Protective Cover-yellow vinyl				1.75 lbs.			134947
Grounding Reel Handle Kit				14 lbs.			133041-KIT
Contact Lubricant				2 oz.			132488
Terminal Cover Assembly				2 oz.			133051S6
Replacement Cable Assembly	133035-8BRZ	#2	75 ft.	25 lbs.			3693-02
Replacement Cable Assembly	133035-8BRZ	#2	50 ft.	18 lbs.			3693-025
Replacement Cable Assembly	133035-8BRZ	1/0	75 ft.	36 lbs.			3693-10
Replacement Cable Assembly	133035-8BRZ	1/0	50 ft.	24 lbs.			3693-105
Replacement Cable Assembly	133035-8BRZ	2/0	75 ft.	42 lbs.			3693-20
Replacement Cable Assembly	133035-8BRZ	2/0	50 ft.	29 lbs.			3693-205
Replacement Cable Assembly	133035-8BRZ	4/0	75 ft.	60 lbs.			3693-40
Replacement Cable Assembly	133035-8BRZ	4/0	50 ft.	41 lbs.			3693-405
Replacement Contacts (2 Required per Reel)							135009S6
Replacement U-Bolt (1 Required per Reel)							135002S6

* Insert desired cable color from Table 14 below.

Temporary Grounding Sets

Temporary grounding sets present an efficient, economical and easily installed means of temporarily grounding live front, pad-mounted UD transformers and switchgear. Catalog number 133040 employs three pliers and catalog number 133040-1, four pliers. #1/0 600 volt copper ground cables extend 18" on either side of a copper Squeezon™ connector, to copper spade terminals bolted to copper overlays which are riveted to the stationary jaws of the locking pliers. This construction assures a low resistance current path between connection. Copper connections are compressed and encased in clear, heat shrink sleeves to greatly reduce fatigue at stress points. The locking pliers are steel-plated with jaws adaptable with equal efficiency to flat or round apparatus terminals. Alternate lengths and sizes of ground cable quoted on request.

An instruction tag wired to each set details installation instructions and cautions against improper application.

Figure 22. Temporary grounding set.

Figure 23. Applied to transformer secondary.

Note: The maximum jaw opening for the vise grip clamp is 1-1/4" with the handle locked.

Table 15. Temporary Grounding Sets

Description	Number of Clamps	Cable Size	Leg Length	Cable Approx. Wt. Each	Short Circuit Current Withstand Symmetrical kA RMS 60 Hz		Catalog Number
					15 Cycles	30 Cycles	
Single-Phase Set	3	1/0 Black	18"	6.5 lbs.	15.8	13	133040
Three-Phase Set	4	1/0 Black	18"	10 lbs.	15.8	13	133040-1
Three-Phase Set	4	2/0 Yellow	18"	11 lbs.	15.8	13	133040-2
Accessories							
Replacement Clamp Assembly for 1/0				1.5 lbs.			133045
Replacement Clamp Assembly for 2/0				1.5 lbs.			133045-20

Table 16. Temporary Grounding Sets Ordering Information

Digits	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	T	G	S	1	0	B	4	3	F	1	0	F	0	2	C	B

Digits 1 - 3

TGS	Ground Clamp & Cable Assy.

Digits 4 and 5 Cable Size

10	1/0 Cable
20	2/0 Cable

Digit 6 Cable Color

Y	Yellow
B	Black
C	Clear

Digit 7 Cable Sections

3	3 sections
4	4 sections

Digits 8 and 9* Cable Length

2F	2 feet
3F	3 feet
4F	4 feet
5F	5 feet
6F	6 feet
7F	7 feet
8F	8 feet
9F	9 feet
1F	10 feet

Digits 10 - 12 Cable Length**

02F	2 feet
03F	3 feet
04F	4 feet
05F	5 feet
06F	6 feet
07F	7 feet
08F	8 feet
09F	9 feet
10F	10 feet
15F	15 feet
20F	20 feet
25F	25 feet

Digit 16 - Optional Bag

Digits 13 - 15 Clamp

From Table 8 determine the clamp for the cable ends. Fill in digit 13-15 with the clamp code. If the clamp style has only one number and one letter, i.e. 2C, add a 0 in front of the number: 02C.

TG1Y41F25F11C03F Add this if the 4th cable section requires a different clamp.

* This cable length applies to the first and second section in three-section set and first, second and third sections in a four-section set.
** This cable length applies to the last section only whether it's a two-, three- or four-section set.

Grounding elbow products

Grounding elbows have become part of the preferred operating procedure for deadfront underground systems because they take advantage of the fault close-in characteristics of loadbreak terminators.

The grounding elbow is molded with high quality yellow EPDM insulating rubber and features a copper connector and tin-plated copper probe complete with an arc follower tip.

Each unit comes standard with 6 foot of either 1/0 or 2/0 600 volt grounding cable. See Ordering Information Table 19 for color choices.

A wide range of ground clamps are available to suit every application from the easy to install locking pliers to clampstick installed ground clamps. Cooper ground clamps have wire ranges from # 8 Solid to 2 inch dia. All ground clamps meet or exceed ASTM F855 standards. See Table 8.

The 15 kV class grounding elbow is a tool that can be used either by itself or with a 200 A, 15 kV class (8.3/14.4 kV) rated feed-thru to visibly ground cables, transformers and switchgear. A grounding elbow at each end of a cable will isolate and ground the cable and keep bushings free from moisture and contamination during the grounding operation. 15 kV class grounding elbows are designed to mate with 200 A loadbreak bushings and accessories rated 8.3/14.4 kV.

The 25 kV class grounding elbow is a tool that can be used either by itself or with a 200 A, 25 kV class (15.2/26.3 kV) rated feed-thru to visibly ground cables, transformers and switchgear. 25 kV class grounding elbows are designed to mate with 200 A loadbreak bushings and accessories rated 15.2/26.3 kV and 35 kV.

The 35 kV Class three-phase grounding elbows are designed for use with 200 A loadbreak bushings and accessories with the same three-phase, 21.1/36.6 kV rating and an interface conforming to IEEE Std 386™ standard – 200 A Loadbreak Interface No. 1, 21.1/36.6 kV (large 35 kV Class interface). The elbow should not be used on 21.1 kV single-phase rated bushings or portable feedthrus. Consult factory for grounding elbows designed for use with large interface 21.1 kV single-phase rated products.

For quick identification, components 21.1/36.6 kV three-phase rated bushings and portable feedthrus are color coded with purple nosepieces; 21.1 kV single-phase rated products have tan nosepieces.

Voltage ratings are in accordance with IEEE Std 386™ standard, Separable Insulated Connector Systems.

Figure 24. 200 A Single-phase grounding elbow assembly.

Components and accessories

Table 17. Copper Ground Cable (See Page 8 for Details)

Cable Size	Cable Dia.	Black Insulation	Clear Insulation	Yellow Insulation
1/0	0.423	3807-1	3826-10	3827-10
2/0	0.508	3807-3	3826-20	3827-20

Table 18. Copper Compression Ferrules (See Page 9 for Details)

Cable Size	1/2-13 thread	5/8-11 thread
1/0	133023-1	133043-010
2/0	133023-2	133043-020

Copper ground cable

Our fine stranded copper cables are made to Class K rope lay for maximum flexibility and conforms to ASTM F855 standards. Standard length is 6 feet (2 meters) and available in several different colors. Other cable sizes and lengths are available. See Ordering Information.

Grounding Elbow and Kits Product Ratings

Grounding elbow fault closure rating:10,000 a rms. Symmetrical for 0.17 s (per IEEE Std 386™ standard).

Table 19. Grounding Elbow and Kits Product Ratings Ordering Information

Digits	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	G	**E**	**2**	**1**	**5**	**1**	**Y**	**0**	**6**	**0**	**2**	**C**	**K**	**1**

Digits 1 - 3	
GE2	Grounding Elbow 200 A

Digits 4 and 5 Cable Size	
15	15 kV
25	25 kV
35	35 kV

Digit 6 Cable Size	
1	1/0 Cable
2	2/0 Cable

Digit 7 Cable Color	
Y	Yellow
B	Black
C	Clear
G	Green

Digits 8 and 9 Cable Length	
06	6 feet
08	8 feet
10	10 feet
12	12 feet

Digits 10 - 12 Clamp
From Table 8 determine the clamp for the cable ends. Fill in digits 11 - 13 using the Clamp Style numbers shown in the first column of Table 8. If the clamp style has only one number and one letter, i.e. 2C, add a 0 in front of the number: 02C.

Digits 13 and 14, Single-phase or Three-phase Kit	
K1	15 kV, 25 kV and 35 kV. See Table 20
K3	15 kV and 25 kV Only. See Table 20

Example: 15 kV elbow with 6' of yellow 1/0 cable and a 3668-100 clamp is: GE2151Y0602CK1

Table 20. Grounding Elbow Kit Replacement Parts

Replacement Parts	15 kV		25 kV		35 kV
Elbow with 1/0 connector, probe and heatshrink sleeve	GE215-1		GE225-1		GE235-1
Elbow with 2/0 connector, probe and heatshrink sleeve	GE215-2		GE225-2		GE235-2
Probe kit with installation tool, silicone lubricant and installation instructions	PK215		PK225		PK235
Connector 1/0	2638018A06L		2638018A06L		2638018A06L
Connector 2/0	2638018A08L		2638018A08L		2638018A08L
Cable	See Table 10		See Table 10		See Table 10
Clamps	See Table 8		See Table 8		See Table 8
Ferrules	Depending on clamp used. See Table 11		Depending on clamp used. See Table 11		Depending on clamp used. See Table 11
Grounding Elbow Kits:	**1-Phase Kit (K1)**	**3-Phase Kit (K3)**	**1-Phase Kit (K1)**	**3-Phase Kit (K3)**	**1-Phase Kit Only (K1)**
Portable Feed-Thru	LPF215H (1)	LPF215H (3)	LPF225H (1)	LPF225H (3)	LPF235H (1)
Insulating Protective Cap	LPC215 (1)	LPC215 (3)	LPC225 (1)	LPC225 (3)	LPC235 (1)
Test Probe	2606602A01	2606602A01	2606602A01	2606602A01	2604088B01 (1)
Carrying Bag, Small	134957-01	—	134957-02	—	N/A
Carrying Bag, Large	—	134958-01	—	134958-02	134958-03
Silicone Lubricant, 5.25 oz (150 g) tube	SG825AC (1 per bag)		SG825AC (1 per bag)		SG825AC (1 per bag)

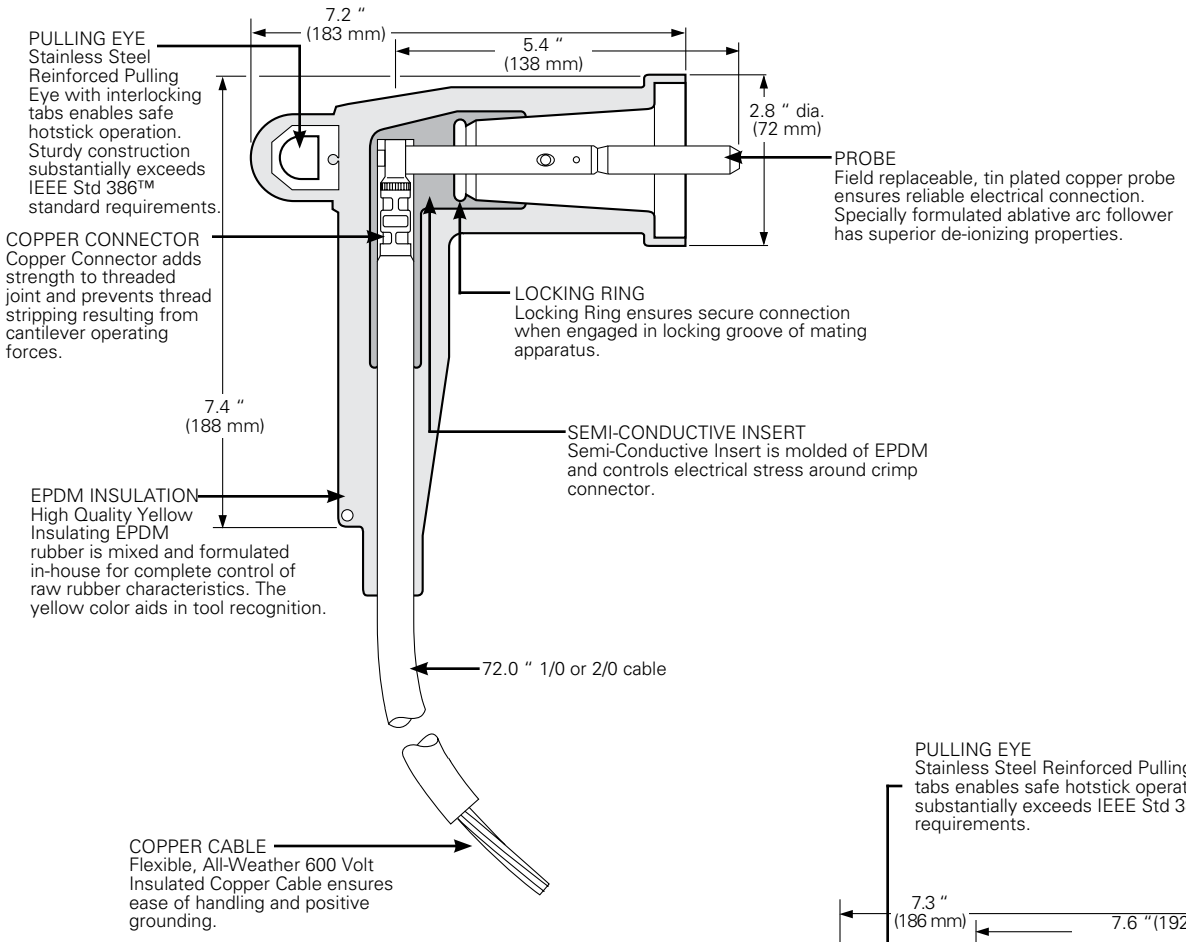

Figure 25. GE215 15 kV grounding elbow.

Note: Dimensions given are for reference only.

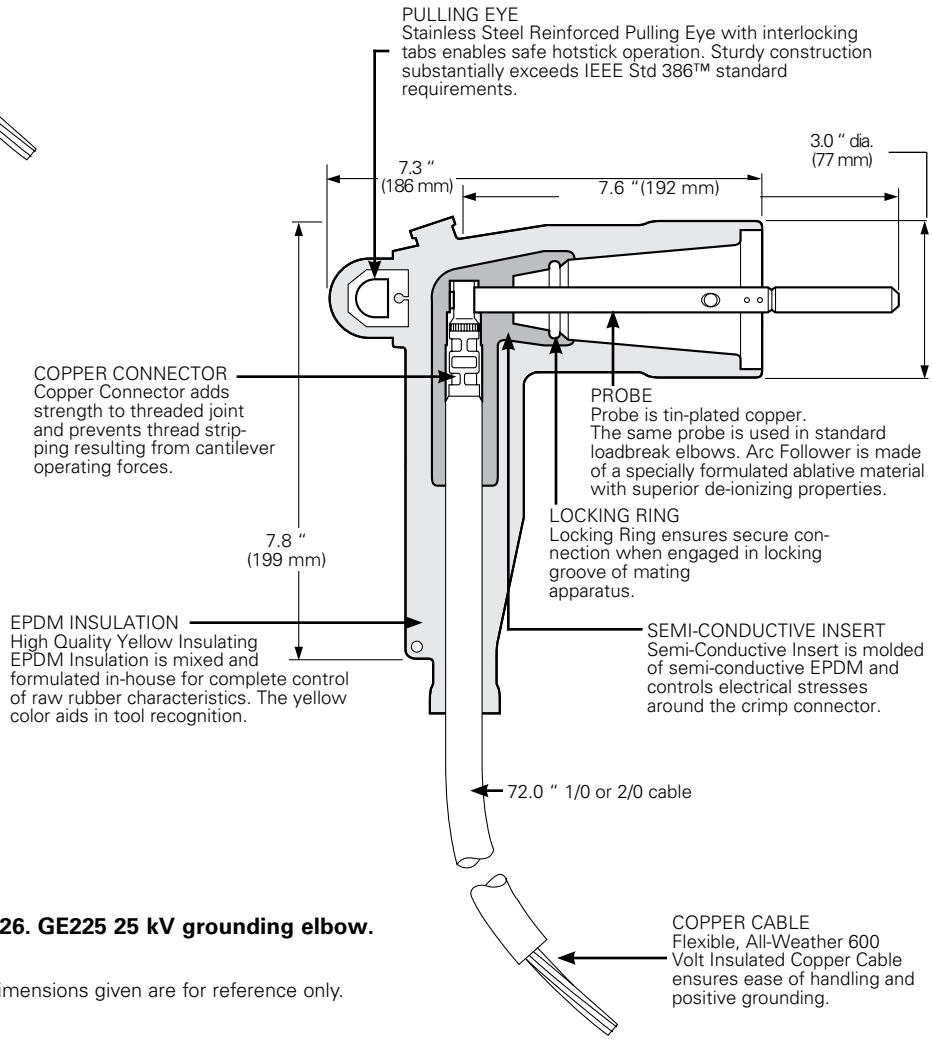

Figure 26. GE225 25 kV grounding elbow.

Note: Dimensions given are for reference only.

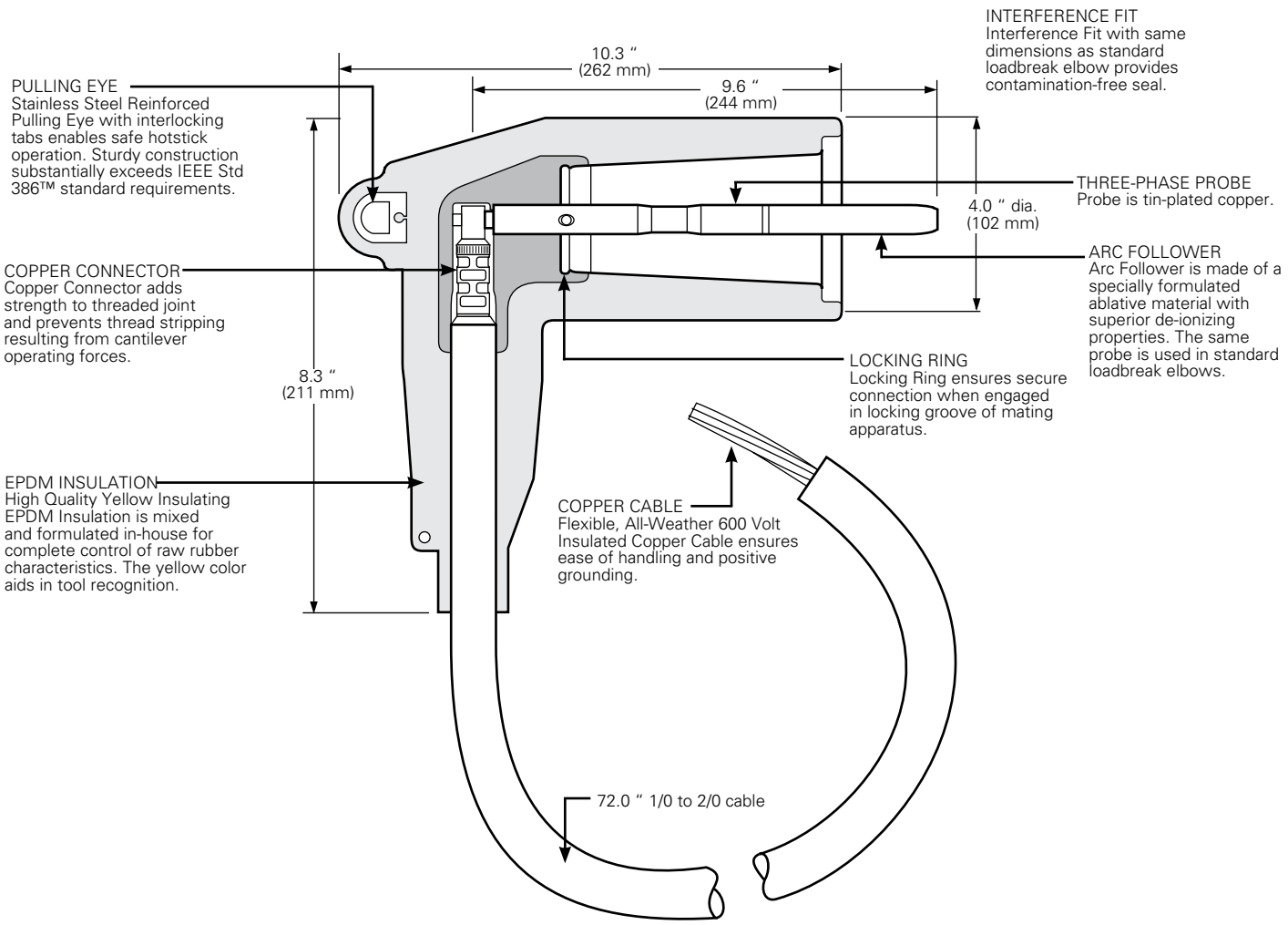

Figure 27. GE235 35 kV grounding elbow.

Note: Dimensions given are for reference only.

200 A grounding kits

General

The grounding kits provide the operating components required to isolate, test and visibly ground a loadbreak terminator system. The grounding kits are used in deadfront pad-mounted apparatus and underground vaults to isolate, test and ground circuits. Isolating, grounding and moisture sealing faulted cable for later repair is made easy when the grounding kit is used with Eaton's Cooper Power Systems 200 A, loadbreak products, or other manufacturers' 200 A, loadbreak products meeting the requirements of IEEE Std 386™ standard – Separable Insulated Connector Systems. When mated with similarly rated products, the grounding kit operating components provide a fully-shielded, submersible, separable grounding system.

A sturdy canvas carrying bag is supplied to ensure the operating components of the grounding kit remain clean and ready for service. The kV Class is clearly marked on the bag.

Installation

Determine whether the circuit is de-energized. Attach the grounding elbow cable to the system ground. Insertion of the portable feedthru into the parking stand on apparatus frontplate and movement of the grounding elbow, protective cap, and test probe are accomplished using a hotstick tool. Refer to Operating Instruction Sheet KS200-01-1 for details.

Figure 28. Grounding elbow is molded of bright yellow EPDM rubber for easy identification. Six-foot flexible copper, 600 volt insulated cable is available in 1/0 or 2/0. Elbow is fully rated for fault close to ensure operator safety.

Figure 29. Portable feedthru is used to isolate, test and ground a circuit. Horizontal feedthru is standard. Contact factory for optional vertical feedthru.

Figure 30. Insulated protective cap insulates, shields and moisture seals any loadbreak bushing interface.

Figure 31. Durable canvas varying bag keeps operating components clean and ready to use. Contents and kV Class are clearly labeled.

Figure 32. Test probe has an eye for easy hotstick handling. It allows electrical access to the bushing contacts so that circuit condition can be confirmed using appropriate test equipment. It should not be used for grounding because it has no fault-close rating.

Clamp clusters

Clamp clusters are an easy and convenient way to provide common point grounding for three-phase grounded neutral systems. They minimize space requirements and the expense of running separate ground lines. Clusters are rated 350 A continuous, 40 kA for 30 cycles.

Table 21. Clamp Clusters

Ground Clamps	Cluster Bar	Catalog Number
(3) 3654-100 C-type	36564	3656-1

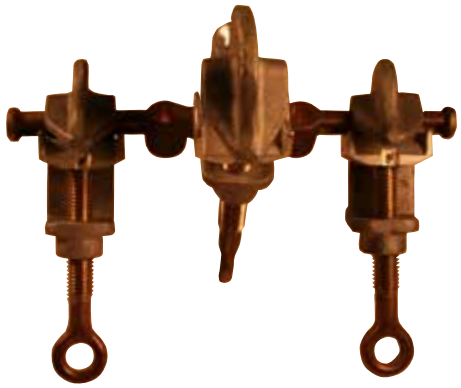

Figure 33. Clamp clusters (Catalog Number 3656-1).

Hanger assembly

The hanger provides a convenient, online parking device for jumper clamps, load pickup clamps or grounding clamps. The hanger has two, 3 1/2" fiberglass rods for clamp parking, and an eye at the lower end of the hanger for installation with a standard clampstick. Tightened on line, the hanger head provides 15 kV separation for the fiberglass hanger rods. One man can easily park an individual clamp while the other clamp is still on the hanger.

Figure 34. Hanger assembly (Catalog Number 132294-1).

Ground cluster block

High strength, lightweight aluminum cluster block is installed on the pole or structure. The 12" bar accepts up to four clamps, which can be removed with a clampstick and installed on conductors to be grounded. If ferrules are installed in holes provided, cables run from ground clamps to cluster block, and from cluster block to ground.

Table 22. Ground Cluster Block

Mounting	Catalog Number
Poly Strap	3817-1
Chain Tightener	3818

Figure 35. Ground cluster block (Catalog Number 3817-1).

Temporary grounding rod

The temporary grounding rod is a timesaving product for maintenance or testing where there is no permanent ground. It can also be used for applications where there is no system neutral. Auger bit and handle are bronze alloy; shaft is copperweld-delivering high-tensile strength and excellent conductivity. A high-quality T-lug is provided for maximum 2/0 ground cable. If required, compression type threaded ferrules can also be used for ground cable connection.

Figure 36. Temporary Grounding Rod (Catalog Number 133007).

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