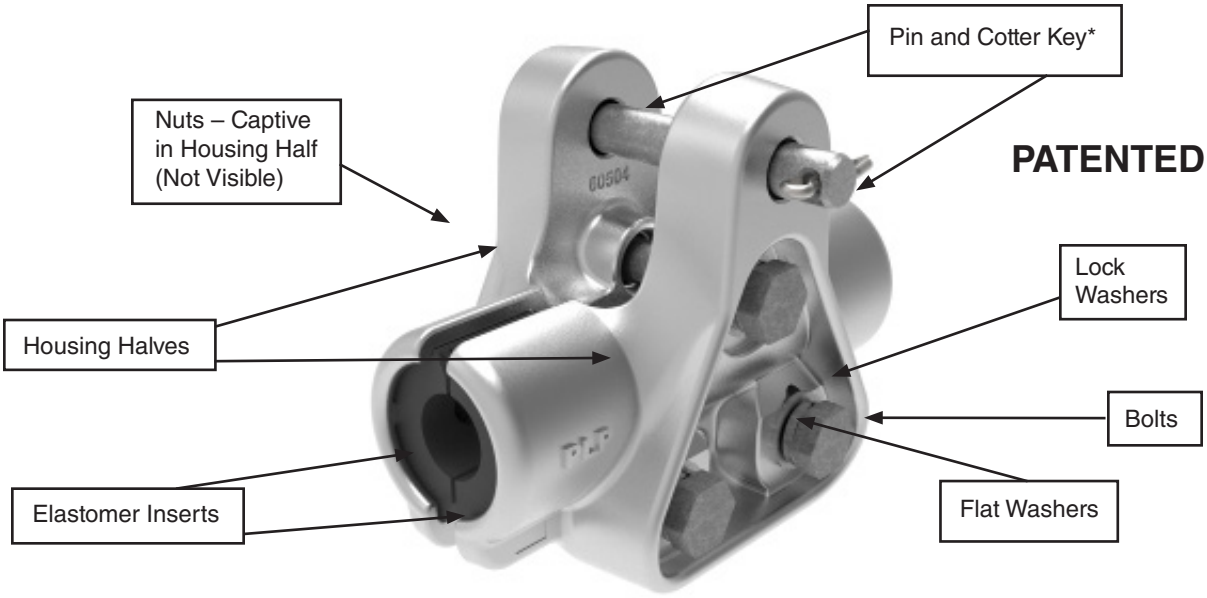
CUSHION-GRIP® Suspension

NOMENCLATURE



GENERAL RECOMMENDATIONS

CUSHION-GRIP Suspensions are intended for use on all aluminum based conductors, and are designed to reduce the static and dynamic stresses at the support point so that the conductor is protected against the effects of oscillations. The conductor is cushioned by field proven, integral elastomer inserts, which guard against abrasion, wear, and fatigue.

The level of protection provided by the CUSHION-GRIP Suspension is comparable to a bolted clamp over armor rods. This equates to a reduction in bending strain as high as 50% as compared to bare conductor in a bolted clamp. This reduction in bending strain can be directly related to an increase in overall conductor life. The standard CUSHION-GRIP Suspension is designed for up to 125°C continuous conductor operation (150°C two hour emergency) and the CGS-HT version can be used for applications with continuous conductor operating temperatures up to 200°C (225°C two hour emergency).

Thermal Rating (Continuous)
Standard 125°C
HT Version 200°C

Features and Benefits:

- The CUSHION-GRIP Suspension is shipped assembled with no loose parts. All fasteners are factory installed to eliminate lost hardware in the field.
- Labor Savings – To install the CUSHION-GRIP Suspension simply spread the body halves, place over the conductor, and tighten bolts.
- Integral Cushions – minimize conductor bending stresses at critical entry locations.
- Compatible with standard attachment hardware.
- Designed for EHV applications – corona free in bundled 345 kV applications. For applications 500 kV and higher, please contact PLP for details.
- Easy Hot Stick application – Lower captive fasteners act as hinge to facilitate hot stick application.

VERTICAL ULTIMATE LOAD. The vertical ultimate load of the CUSHION-GRIP Suspension is listed in the table on the next page.

SLIP LOAD. When initially installed, the CGS Clamp has a slip load that ranges between 10% to 15% of the conductor's rated breaking strength (RBS).

LINE ANGLE. The maximum recommended line angle for a CUSHION-GRIP Suspension is 30° as a single suspension and 60° in a double configuration utilizing a yoke plate.

* Can be supplied with a bolt/nut/cotter in place of the suspension pin and cotter.

CUSHION-GRIP® Suspension

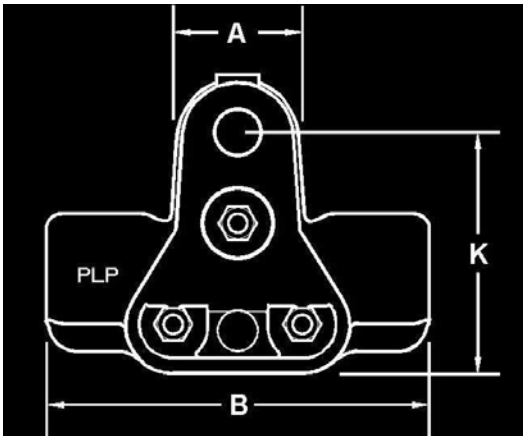
Catalog Number Range	Conductor Range Inches (mm)		Nominal Conductor Size*	Height Inches (mm)	Width Inches (mm)		Length Inches (mm)	Weight Pounds (kg)	Standard Carton Quantity	Vertical Ultimate Load
	Min.	Max.			Min.	Max.				
CGS-1095	0.312 (7.9)	0.608 (15.4)	#2-4/0	4.85 (123 mm)	0.80 (9 mm)	1.20 (30 mm)	6.5 (165)	2.5 (1.1 kg)	10 units	15,000 lbs. (67 kN)
CGS-1096	0.609 (15.5)	0.883 (22.4)	266.8-477	5.30 (135 mm)	3.30 (84 mm)	3.85 (98 mm)	6.85 (169 mm)	4.00 (1.8 kg)	3 units	25,000 lbs. (111 kN)
CGS-1097	0.884 (22.5)	1.196 (30.4)	556.5-954	6.00 (152 mm)	3.30 (84 mm)	3.85 (98 mm)	7.55 (192 mm)	5.5 (2.5 kg)	3 units	
CGS-1098	1.197 (30.4)	1.545 (39.2)	1033.5-1590	6.25 (159 mm)	3.30 (84 mm)	3.85 (98 mm)	8.60 (218 mm)	6.7 (3.0 kg)	3 units	
CGS-1120	1.546 (39.2)	1.569 (39.8)		7.60 (183 mm)	3.90 (99.8 mm)	4.40 (111.8 mm)	9.20 (234 mm)	9.5 (4.3 kg)	3 units	30,000 lbs (136 kN)
CGS-1121	1.570 (39.8)	1.639 (41.6)	1780; 84/19							
CGS-1122	1.640 (41.7)	1.707 (43.3)								
CGS-1123	1.708 (43.4)	1.77 (45.0)	2156; 84/19 & 72/7							
CGS-1124	1.772 (45.0)	1.833 (46.5)	2312; 76/19							
CGS-1125	1.834 (46.6)	1.892 (48.0)								
CGS-1126	1.893 (48.1)	1.948 (49.5)								
CGS-1127	1.949 (49.5)	2.001 (50.8)								

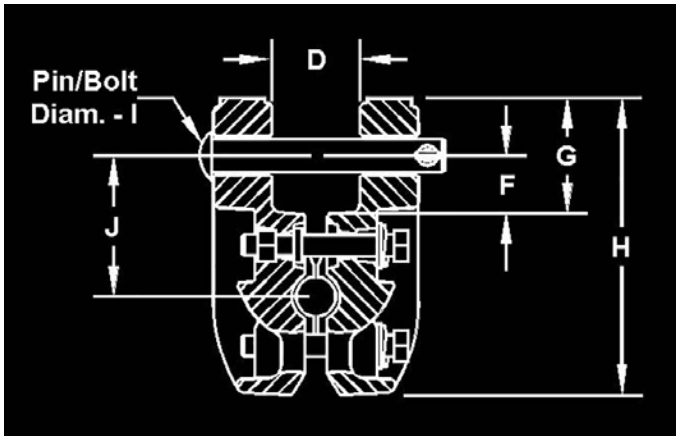
NOTES: For high temperature (HT) version add HT to the catalog number (Example - CGS -1096-HT).
Add CE, YC, or SE to catalog number to include Clevis Eye, Y-Clevis Eye or Socket Eye (Example: CGS1096SE or CGS-1096HTSE).
For bolt, nut & cotter pin in place of pin, add BNK to catalog number (Examples: CGS-1096-BNK, CGS-1096HTBNK).

*Consult the Product and Conductor Selection Charts at the front of the Transmissions Catalog for details.

CUSHION-GRIP® Suspension

DIMENSIONAL TABLES





Conductor Range – Inches (mm)		Dimensions – Inches (mm)									
				D							
Min.	Max.	A	B	Min.	Max.	F	G	H	I	J	K
0.312 (7.9)	0.608 (15.4)	2.00 (51)	6.5 (165)	0.80 (20.3)	1.20 (30.5)	1.00 (25.4)	2.00 (51)	4.85 (123)	5/8 (15.9)	2.40 (61)	3.85 (98)
0.609 (15.5)	0.883 (22.4)	2.25 (57)	6.85 (174)	1.15 (29.2)	1.70 (43.2)	1.05 (26.6)	2.00 (51)	5.30 (135)	5/8 (15.9)	2.60 (66)	4.30 (109)
0.884 (22.5)	1.196 (30.4)	2.25 (57)	7.55 (192)	1.15 (29.2)	1.70 (43.2)	1.05 (26.6)	2.00 (51)	6.00 (152)	5/8 (15.9)	2.70 (69)	5.00 (127)
1.197 (29.9)	1.545 (39.2)	2.25 (57)	8.60 (218)	1.15 (29.2)	1.70 (43.2)	1.10 (27.9)	2.10 (53.5)	6.25 (159)	5/8 (15.9)	2.90 (74)	5.24 (133.4)
1.546 (39.2)	2.001 (50.8)	2.50 (63.5)	9.20 (234)	1.25 (32.8)	1.80 (45.7)	1.25 (32.8)	2.50 (63.5)	7.60 (193)	5/8 (15.9)	3.50 (89)	6.35 (161.3)

See diagram above for CGS dimensions for assistance in choosing the appropriate mating hardware part numbers.

CGS HARDWARE & FITTINGS

Shown below are the Clevis Eye (1), Y-Clevis Eye (2), Socket Eye (3), Socket Clevis (4), Yoke Plate (5), Vertical Bundle Links (6) and Hold-Down Shackles (7) that can be used in conjunction with the CUSHION-GRIP Suspension.

NOTE: See Section 8 – Transmission Line String Hardware for detailed dimensions of these components.

1

CE-5105

CE-5259 (for CGS-1095)

CE-5107 (for CGS-1096 1097, 1098)

2

YC-5212

YC-5206 (for CGS-1095)

3

SE-5150 (for CGS-1095)

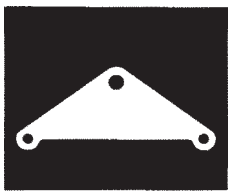
SE-5156 (for use with CGS-1096, 1097, 1098)

SE-5157 (for CGS-1120-1127)

4

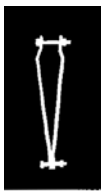
SC-5194

5



YP-5907

6



VBL-MS-11244 (12")
VBL-MS-11302 (18")

7

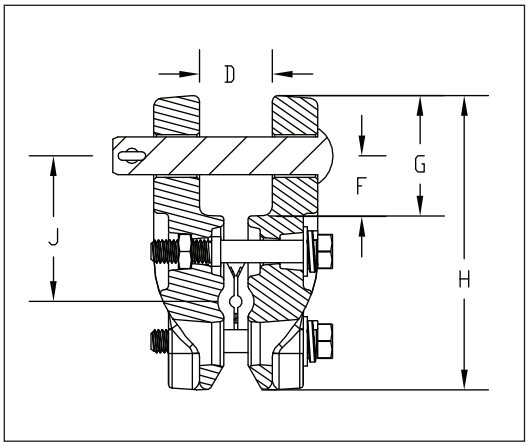
Conductor Range	Hughes Brothers	Hubbell
0.609" – 1.196"	1888.5	88016 – 2000
1.197" – 1.545"	1888.10	88018 – 2000
1.546" – 2.052"	1888.13	N/A

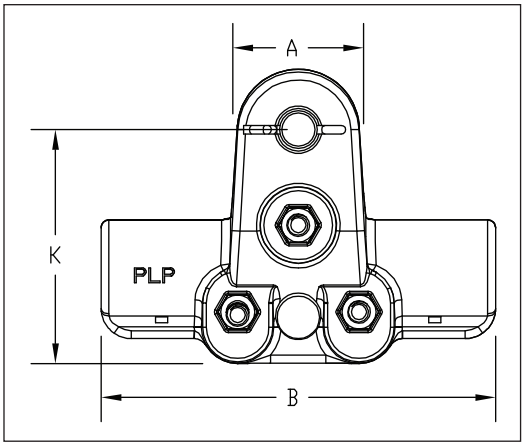
CUSHION-GRIP® Suspension

For use on:
Galvanized Steel Strand

				H	D		B			
Catalog Number	Conductor Range Inches (mm)		Nominal Conductor Sizes	Height Inches (mm)	Width Inches (mm)		Length Inches (mm)	Weight Pounds (Kg)	Standard Carton Quantity	Vertical Ultimate Load
	Min.	Max.			Min.	Max.				
CGS-1095G	.312 (7.9)	.608 (15.5)	5/16"-1/2"	4.62 (117)	.80 (20.3)	1.20 (30.5)	5.5 (140)	5 (2.2)	3	20,000 lbs (84 KN)

DIMENSIONAL TABLES

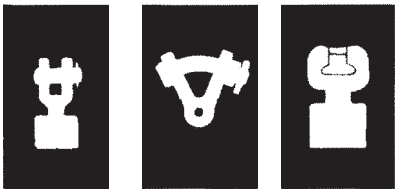




Dimensions – Inches (mm)									Material
A	B	D	F	G	H	I	J	K	
2.00 (50.8)	5.48 (139.2)	1.10 (27.94)	0.98 (24.89)	1.98 (50.30)	4.62 (117.34)	.625 (15.87)	2.40 (60.96)	3.62 (91.95)	Ductile Iron

CGS HARDWARE & FITTINGS

1 2 3

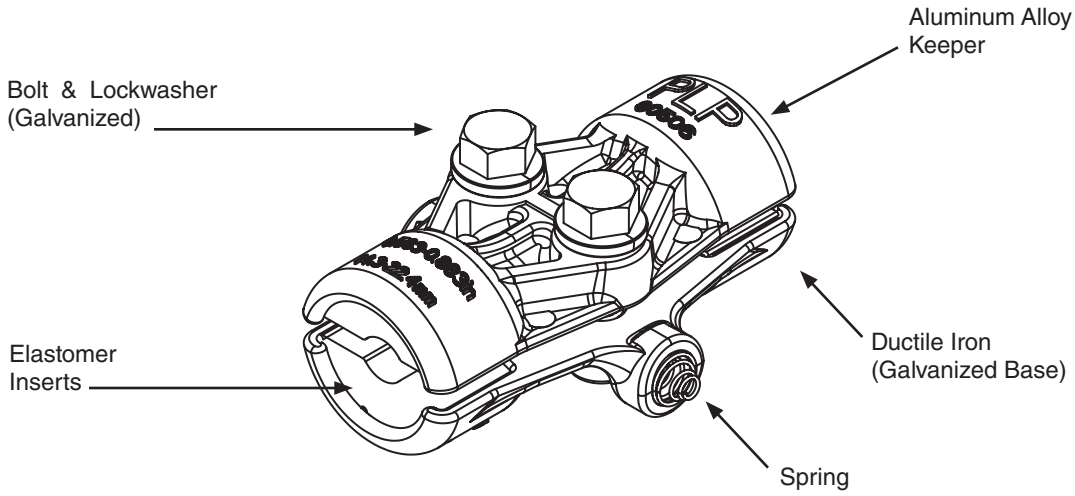


CE-5261 YC-5207 SE-5150

NOTE: See section 8 – Transmission Line String Hardware for detailed dimensions of these components.

CUSHION-GRIP® Support

NOMENCLATURE



GENERAL RECOMMENDATIONS

The CUSHION-GRIP Support is intended for use on all aluminum based conductors, and is designed to reduce the static and dynamic stresses at the support point, so that the conductor is protected against the effects of oscillations. The conductor is cushioned by field proven, integral elastomer inserts, which guard against abrasion, wear, and fatigue.

The level of protection provided by the CUSHION-GRIP Support is comparable to a bolted clamp over armor rods. This equates to a reduction in bending strain as high as 50% as compared to bare conductor in a bolted clamp. This reduction in bending strain can be directly related to an increase in overall conductor life. The CUSHION-GRIP Support is designed for up to 125°C continuous conductor operation (150°C two hour emergency), and the HT version can be used for applications with continuous conduction operating temperatures up to 200°C (225°C two hour emergency).

Thermal Rating (Continuous)
Standard 125°C
HT Version 200°C

Features and Benefits:

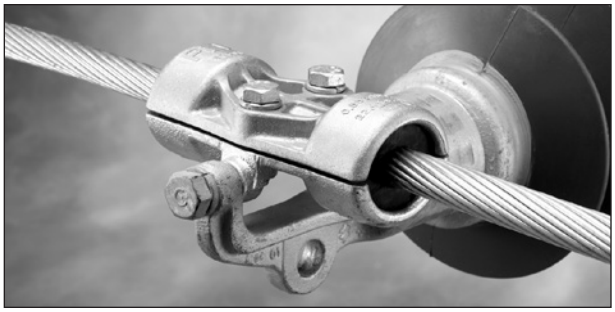
- The CUSHION-GRIP Support is shipped assembled. All fasteners are captivated in the keeper.
- Labor Savings – To install the CUSHION-GRIP Support simply install the base, place the keeper over the conductor, and tighten bolts.
- Integral Cushions – minimize conductor bending stresses at critical entry locations.

VERTICAL ULTIMATE LOAD. The CUSHION-GRIP Support will withstand a pulloff load from the trunnion pins of the insulator cap of 5,000 lbs., applied in any direction. This includes the vertical up direction (uplift).

SLIP LOAD. When initially installed, the CGS has a slip load that ranges between 10% to 15% of the conductor's rated breaking strength (RBS).

LINE ANGLE. The maximum recommended line angle for a CUSHION-GRIP Support is 30°.

CUSHION-GRIP® Support

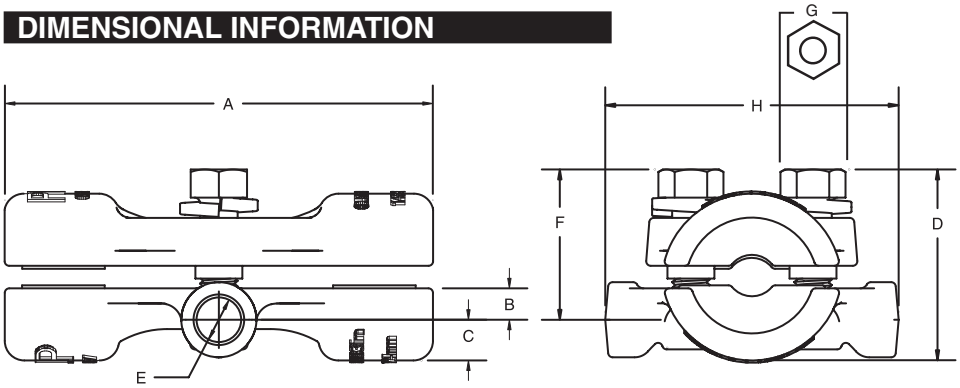


ORDERING INFORMATION

Catalog Number	Conductor Range (mm)		Nominal Conductor Sizes*	Weight/Unit Pounds (Kg)	Standard Carton Quantity
	Min.	Max.			
CGS-2100	.312" (7.9)	.608" (15.4)	#2 to 4/0	1.45 (0.66)	3
CGS-2101	.609" (15.4)	.883" (22.4)	266 Kcmil to 477 Kcmil	2.40 (1.1)	3
CGS-2102	.884" (22.4)	1.196" (30.4)	556 Kcmil to 954 Kcmil	3.50 (1.6)	3
CGS-2103	1.197" (30.4)	1.504" (38.2)	954 Kcmil to 1590 Kcmil	5.00 (2.3)	3

Note: For high temperature (HT) version add "HT" to the catalog number (Example: CGS-2102HT).
*Consult the Product and Conductor Selection Charts at the front of the Transmissions Catalog for details.

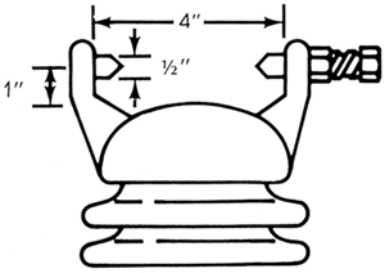
DIMENSIONAL INFORMATION



Catalog Number	Dimensions (m)							
	A	B	C	D	E	F	G	H
CGS-2100	5.3	0.34	0.42	2.1	0.595	1.7	9/16	3-7/8
CGS-2101	6.7	0.42	0.51	2.6	0.595	2	3/4	3-7/8
CGS-2102	6.9	0.70	0.34	2.9	0.595	2.6	3/4	3-7/8
CGS-2103	6.5	0.75	0.88	3.4	0.595	2.4	3/4	3-7/8

CLAMP TOP TRUNNION

To ensure proper fit and service life, it is recommended that only line post insulators with clamp top trunnion caps that conform to ANSI standards be used. See the illustration on the right for nominal cap dimensions that illustrate ANSI standards that have been established outlining the permissible dimensions and tolerances for trunnion caps. Consult the insulator manufacturer when in doubt about insulator standards.



The above dimensions are approximates for design information. Consult ANSI specification C29.7-1977 for exact dimensions.